

This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

EducT
118.97
610

GRADED LESSONS IN ARITHMETIC

BY

W. F. Nichols

GRADE III.

THOMPSON, BROWN & CO.
BOSTON.

Educ T 118.97.610 Grade III

CANCELLED

ESSEX INSTITUTE.

PRESENTED BY

Salem School Board.

The Library Committee shall divide the books and other articles belonging to the Library into three classes, namely, (a) those which are not to be removed from the building; (b) those which may be taken only by written permission of three members of the committee; (c) those which may circulate under the following rules.

Members shall be entitled to take from the Library two folio or quarto volumes, or four volumes of lesser fold, upon having them recorded, and promising to make good any damage they sustain, while in their possession, and to replace the same if lost, or pay a sum fixed by the Library Committee.

No person shall lend any book belonging to the Institute, excepting to a member, under a penalty of one dollar for each offence.

The Library Committee may allow members to take more than the allotted number of books upon a written application.

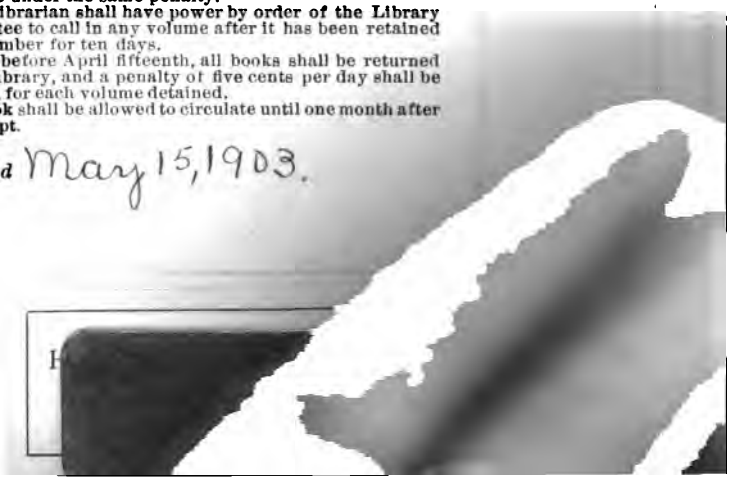
No person shall detain any book longer than four weeks from the Library, if notified that the same is wanted by another member, under a penalty of five cents per day, and no volume shall be detained longer than three months at one time under the same penalty.

The Librarian shall have power by order of the Library Committee to call in any volume after it has been retained by a member for ten days.

On or before April fifteenth, all books shall be returned to the Library, and a penalty of five cents per day shall be imposed for each volume detained.

No book shall be allowed to circulate until one month after its receipt.

Received May 15, 1903.



3 2044 097 003 990



GRADED LESSONS

IN

ARITHMETIC

GRADE III.

BY

WILBUR F. NICHOLS, A.M.

PRINCIPAL HAMILTON STREET SCHOOL, HOLYOKE, MASS.

THOMPSON, BROWN & CO.

BOSTON. CHICAGO.

Educ T 118.97.610

COPYRIGHT, 1897,
BY WILBUR F. NICHOLS.

C. J. PETERS & SON, TYPOGRAPHERS,
BOSTON.

Plimpton Press
H. M. PLIMPTON & CO., PRINTERS & BINDERS,
NORWOOD, MASS., U.S.A.

GENERAL INTRODUCTION.

1. THESE lessons have been prepared in the belief that it is a mistake to assume that one topic is to be finished before another is begun. The elements of many topics are here given in lower grades in explanations, illustrations, and examples easily understood by the younger pupils; and then the work in each topic is made more and more difficult through the various grades until it is finished. These examples have stood the test of the school-room, and in no case have they been found too difficult.

2. The arrangement of the topics is such that pupils in passing into a new grade find but few new topics, and many pupils are prepared for promotion from grade to grade at various times during the year, and are not obliged to wait for the annual promotions.

3. Such practical subjects as Percentage and Interest are introduced in the lower grades, where many pupils are found who are obliged to leave school before they reach the more advanced grades.

4. Clear conceptions of geometric forms and mensuration are introduced at an early period, that principles thus developed may be applied to many practical problems.

5. One or more lessons are given to the developing of a new topic; then the following lessons are so arranged as to give the pupils practice in applying the new topic in

connection with all the other topics previously learned. This constant review will be found very beneficial.

6. Few teachers will find the need of supplementary work, as so large a number of problems are given. On the other hand, few pupils should be required to solve all the problems. It is a good way to assign for required work for all the class that number of examples which even the slowest child can do, and then allow any child to work the remaining examples of the lesson as optional work.

7. The large amount of oral or mental examples will be appreciated by those who believe that ten minutes each day should be given to work of this kind. These are not mental gymnastics, but plain, practical, every-day questions.

8. The introduction of Algebra and Geometry in the higher grades will be found beneficial.

9. The methods here advocated are the short methods found in daily use among bankers, mechanics, and merchants.

The author desires to express his acknowledgments for many valuable suggestions to Mr. C. H. Morss, Superintendent of Schools of Medford, Mass.

WILBUR F. NICHOLS.

HOLYOKE, *September*, 1897.

INTRODUCTION TO GRADE III.

THE work of this book is designed for pupils of the third school year. It contains: 1, a review of the preceding book; 2, a continuation and extension of the work in the fundamental processes and in fractions; 3, the introduction of several new principles in their simplest form, as Percentage.

The exercises are divided into lessons for convenience. But this is not intended to indicate the amount which should be given for a single lesson. See general introduction.

Better results will follow if the order indicated here is quite closely followed; for it combines new principles, and review of old principles, in such a way as to make the advance more uniform and thorough.

CONTENTS.

Fundamental Processes.

Addition . . . . Lessons 7, 11, 13, 16, 48, 72, 80, 86, 94, 108, 118
Subtraction . . . . Lessons 4, 7, 13, 18, 46, 72, 80, 82, 86, 110
Multiplication . . . Lessons 6, 10, 16, 50, 72, 82, 94, 104, 112
Division . . . . . Lessons 18, 24, 30, 52, 58, 72, 82, 104, 114

Fractions.

Addition . . . . . Lessons 21, 62, 72, 116
Subtraction . . . . . Lessons 21, 68, 72, 116
Changing Form of . . . . . Lessons 36, 38, 61, 86, 90
Decimal Point . . . . . Lesson 26

Denominate Numbers.

Long Measure . . . . . Lesson 47
Measurements . . . . . Lessons 73, 74
Miscellaneous Table . . . . . Lesson 71
Prisms, Surface . . . . . Lesson 28
Prisms, Contents . . . . . Lesson 54
Rectangles, Area . . . . . Lessons 5, 78
Rectangles, Compared . . . . . Lesson 14
Reduction . . . . . Lesson 56
Time Measure . . . . . Lessons 31, 69
Triangles, Right . . . . . Lesson 32
Triangles, Isosceles . . . . . Lesson 84

Percentage . . . . . Lessons 20, 22, 30, 75, 81, 101

GRADED LESSONS IN ARITHMETIC.

GRADE III.

LESSON 1.

Give the pupils a handful of sticks.

1. Tie 10 sticks into a bundle. Call this bundle a TEN.
2. Make another *ten*. Make a third *ten*.
3. How many tens and how many units must you take to have 11? 21? 12? 22? 13? 23? 14? 24? 15? 25? 16? 26? 17? 27? 18? 28? 19? 29? 30?
4. Write 1 ten and 9 units.
5. Write 2 tens and 1 unit.
6. Write 2 tens and 4 units.
7. Write 1 ten and 7 units.
8. Write 1 ten and 3 units.
9. Write 2 tens and 5 units.
10. Write 1 ten and 8 units.
11. Under 2 tens and 5 units, write 1 ten and 2 units.
12. Under 2 tens and 8 units, write 2 tens and 1 unit.
13. Under 2 tens and 1 unit, write 1 ten and no units.
14. Under 1 ten and no units, write 2 tens and 4 units.
15. Under 1 ten and 9 units, write 1 ten and 4 units.
16. Write the following in columns, units under units and tens under tens: 4 tens, 6 units; 2 tens, 7 units; 6 tens, 7 units; 5 tens, 6 units; 7 tens, 3 units; 6 tens, 4 units.
17. Write in columns: 5 tens, 2 units; 2 tens, 1 unit; 2 tens, 6 units; 1 ten, 3 units; 9 tens, 2 units; 7 tens, 5 units.

NOTE. — In the second grade the pupils learned that 5 and 7 are 12; they can now readily see that 50 and 70 are 5 tens and 7 tens, or 12 tens, or 120.

1.	10	20	30	40	50	60	70	80	90
	10	10	10	10	10	10	10	10	10

NOTE. — In the place of 10 in Example 1, put 20, 30, 40, 50, 60, 70, 80, 90, and add.

2.	10	20	30	40	50	60	70	80	90
	1	1	1	1	1	1	1	1	1

NOTE. — In Example 3, and all the other Examples in this lesson, in place of 1 put 2, 3, 4, 5, 6, 7, 8, 9, and add; also in the tens place put 1, 2, 3, 4, 5, 6, 7, 8, 9, and add.

3.	11	21	31	41	51	61	71	81	91
	1	1	1	1	1	1	1	1	1
4.	12	22	32	42	52	62	72	82	92
	1	1	1	1	1	1	1	1	1
5.	13	23	33	43	53	63	73	83	93
	1	1	1	1	1	1	1	1	1
6.	14	24	34	44	54	64	74	84	94
	1	1	1	1	1	1	1	1	1
7.	15	25	35	45	55	65	75	85	95
	1	1	1	1	1	1	1	1	1
8.	16	26	36	46	56	66	76	86	96
	1	1	1	1	1	1	1	1	1
9.	17	27	37	47	57	67	77	87	97
	1	1	1	1	1	1	1	1	1
10.	18	28	38	48	58	68	78	88	98
	1	1	1	1	1	1	1	1	1
11.	19	29	39	49	59	69	79	89	99
	1	1	1	1	1	1	1	1	1

ORAL.

1. Copy, fill blanks, and memorize:

$1 \times 2 = ?$	$1 \times 3 = ?$	$1 \times 4 = ?$	$1 \times 5 = ?$
$2 \times 2 = ?$	$2 \times 3 = ?$	$2 \times 4 = ?$	$2 \times 5 = ?$
$3 \times 2 = ?$	$3 \times 3 = ?$	$3 \times 4 = ?$	$3 \times 5 = ?$
$4 \times 2 = ?$	$4 \times 3 = ?$	$4 \times 4 = ?$	$4 \times 5 = ?$
$5 \times 2 = ?$	$5 \times 3 = ?$	$5 \times 4 = ?$	$5 \times 5 = ?$
$6 \times 2 = ?$	$6 \times 3 = ?$	$6 \times 4 = ?$	$6 \times 5 = ?$
$7 \times 2 = ?$	$7 \times 3 = ?$	$7 \times 4 = ?$	$7 \times 5 = 35$
$8 \times 2 = ?$	$8 \times 3 = ?$	$8 \times 4 = 32$	$8 \times 5 = 40$
$9 \times 2 = ?$	$9 \times 3 = ?$	$9 \times 4 = 36$	$9 \times 5 = 45$
$10 \times 2 = ?$	$10 \times 3 = ?$	$10 \times 4 = 40$	$10 \times 5 = 50$
$11 \times 2 = ?$	$11 \times 3 = 33$	$11 \times 4 = 44$	$11 \times 5 = 55$
$12 \times 2 = ?$	$12 \times 3 = 36$	$12 \times 4 = 48$	$12 \times 5 = 60$

2. If a keg holds 36 quarts of water, how many gallons will it hold?

3. Jennie had three-quarters of a dollar, and spent 50 cents. How much money had she left?

4. When you know the cost of one apple, how can you get the cost of any number of apples?

5. When you know the cost of a number of peaches, how can you get the cost of one peach?

6. If a man walks 4 miles an hour, how many hours will it take him to walk 40 miles?

7. In 21 feet there are —— yd. and —— ft.

8. In 35 feet there are —— yd. and —— ft.

9. In 38 feet there are —— yd. and —— ft.

10. Charles has 31 cents and George 23 cents; how many cents must Charles give George that both boys may have the same amount?

11. How many days in June, July, and August?

SUBTRACTION.

Units of minuend smaller than units of subtrahend.

NOTE. — Do not use the word *borrow*. We do not borrow what we have no intention of returning; we simply take it. Have the pupils perform the subtraction with splints before attempting to put the work on paper. Give the pupil 2 tens and 3 units. He will readily see that in order to take away 1 ten and 7 units he must resolve one ten into units. He will then have 1 ten and 13 units. From this he can readily take 1 ten and 7 units.

$$\begin{array}{r} {\scriptstyle 1\ 13} \\ 23 \\ 17 \\ \hline 6 \end{array}$$

Explain clearly that we take 1 ten from the 2 tens, which of course equals 10 units. This added to 3 units makes 13 units. 7 units from 13 units leaves 6 units. 1 ten from 1 ten leaves nothing.

SHORT METHOD. — When you have taken the ten from the tens column, do not add it to the units figure 3, but from it subtract 7 units, which leaves 3 units, and 3 units added makes 6 units. The advantage of this is that the minuend will always be 10.

$$\begin{array}{r} {\scriptstyle 10+3} \\ 23 \\ 17 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 27 \\ 19 \\ \hline 8 \end{array}$$

9 from 10 leaves 1, and 7 added makes 8. 1 ten from 1 ten leaves nothing.

1.	**2.**	**3.**	**4.**	**5.**	**6.**	**7.**	**8.**	**9.**
21	23	25	27	22	24	26	31	34
13	17	16	19	14	18	19	17	19

10.	**11.**	**12.**	**13.**	**14.**	**15.**	**16.**	**17.**	**18.**	**19.**
21	23	25	27	22	24	26	35	24	53
14	19	17	18	15	19	18	28	16	36

20.	**21.**	**22.**	**23.**	**24.**	**25.**	**26.**	**27.**	**28.**	**29.**
21	22	23	24	25	26	27	34	72	81
15	16	18	17	18	17	18	25	57	45

AREA OF RECTANGLES.

1. Draw a rectangle 12 inches long and 5 inches wide. Divide it into square inches. How many are there?

2. How many rows have you running lengthwise? How many inch squares in each row?

3. If you have 5 rows, and there are 12 squares in each row, you have 5 times 12 squares, which are —— squares.

Find the area of the following:

4. A rectangle, 10 inches by 5 inches.

5. A square, measuring 5 inches on a side.

6. A rectangle, 12 inches by 4 inches.

7. A rectangle, 11 inches by 3 inches.

8. A rectangle, 9 inches by 5 inches.

9. How can you find the area of squares and rectangles a shorter way than by dividing them into inch squares and counting the number? *Ans.* Multiply the length by the breadth.

10. Find the perimeter of each one of the rectangles just given.

11. Draw a rectangle 10 inches by 4 inches. Divide it into 2 right-triangles. What part of the rectangle is each triangle? What is the area of each?

Find the perimeter and area of:

12. A rectangle, 9 inches by 4 inches.

13. A square, measuring 4 inches on a side.

14. A rectangle, 4 inches by 6 inches.

15. A rectangle, 3 inches by 9 inches.

16. A rectangle, 4 inches by 12 inches.

17. A rectangle, 7 inches by 4 inches.

18. A square, measuring 3 inches on a side.

19. A rectangle, 8 inches by 3 inches.

20. A rectangle, 6 inches by 5 inches.

21. A rectangle, 12 inches by 5 inches.

MULTIPLICATION.

Copy, fill blanks, and learn:

$1 \times 6 = ?$	$4 \times 6 = ?$	$7 \times 6 = 42$	$10 \times 6 = 60$
$2 \times 6 = ?$	$5 \times 6 = ?$	$8 \times 6 = 48$	$11 \times 6 = 66$
$3 \times 6 = ?$	$6 \times 6 = 36$	$9 \times 6 = 54$	$12 \times 6 = 72$

$$\begin{array}{r} 24 \\ \times\ 2 \\ \hline 8 \end{array}$$

First multiply the units by the multiplier. 2 times 4 units are 8 units; write it under units. 2 times 2 tens are 4 tens; write it under tens. The answer is 4 tens and 8 units, or 48.

Multiply:

1.	**2.**	**3.**	**4.**	**5.**	**6.**	**7.**	**8.**
64	72	91	33	51	24	32	33
2	3	6	2	6	2	4	3

Multiply:

9.	**10.**	**11.**	**12.**	**13.**	**14.**	**15.**	**16.**
30	23	90	82	74	22	34	63
5	3	6	4	2	4	2	3

Multiply:

17.	**18.**	**19.**	**20.**	**21.**	**22.**	**23.**	**24.**
44	52	64	81	80	79	14	88
2	4	2	5	6	1	2	1

Multiply:

25.	**26.**	**27.**	**28.**	**29.**	**30.**	**31.**	**32.**
12	13	31	42	41	41	50	61
3	3	6	4	5	6	5	6

Multiply:

33.	**34.**	**35.**	**36.**	**37.**	**38.**	**39.**	**40.**
64	73	82	46	53	66	82	14
2	3	2	1	3	1	3	2

Add and subtract:

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
18	19	18	24	13	19	36	45	66	91
16	12	17	19	7	3	27	24	48	71

11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
21	32	43	52	36	41	94	75	61	72
17	28	16	29	28	29	76	25	44	26

21.	22.	23.	24.	25.	26.	27.	28.	29.	30.
48	36	76	55	63	72	89	98	71	63
24	18	29	45	53	56	72	89	54	50

31.	32.	33.	34.	35.	36.	37.	38.	39.	40.
17	28	39	48	57	68	79	85	94	42
12	17	26	46	44	53	61	72	76	24

41. 42. 43. 44. 45. 46. 47. 48. 49. 50.

51. $7+8+9+4+6+8+5+7+4+3=?$

52. $9+7+7+6+8+9+7+6+8+9=?$

53. $8+7+6+5+4+3+2+1+0+7=?$

54. $9+8+7+6+5+4+3+2+1+0=?$

55. $4+6+9+7+8+9+6+5+8+7=?$

56. $6+5+4+7+9+8+7+8+5+4=?$

57. $7+8+9+6+4+9+8+7+6+5=?$

58. $8+4+7+3+2+1+7+5+9+8=?$

59. $6+7+8+8+7+7+9+4+7+6=?$

Multiply:

60.	61.	62.	63.	64.	65.	66.	67.	68.	69.
20	21	32	43	50	54	61	72	83	92
5	6	4	3	6	2	5	3	2	2

Copy, fill blanks, and learn:

$1 \times 7 = ?$	$4 \times 7 = ?$	$7 \times 7 = 49$	$10 \times 7 = 70$
$2 \times 7 = ?$	$5 \times 7 = 35$	$8 \times 7 = 56$	$11 \times 7 = 77$
$3 \times 7 = ?$	$6 \times 7 = 42$	$9 \times 7 = 63$	$12 \times 7 = 84$

1. How many half-dimes in 50 cents?

2. How many yards in 30 feet?

3. If 6 oranges cost 30 cents, what will 3 oranges cost?

4. How many weeks in 50 days?

5. Draw a rectangle 6 inches long and 4 inches wide. Find its area and perimeter.

6. Draw another rectangle whose area shall be just ½ of the first one. How long and how wide have you made it?

7. Draw a right-triangle that is 7 in. long and 4 in. high. How many square inches does it contain?

8. How does the area of this triangle compare with the area of a rectangle having the same measurements?

9. Count by 7's from 1 to 84, and count back.

10. A man gave $35 for a wagon, and paid $4 for repairing it. For how much must he sell it to gain $11?

11. A boy having 12 cents spent 7, and then found 9. How many cents had he then?

12. Mary has 11 apples, and John has 7 times as many pears and 3 more. How many pears has John?

13. What is the cost of 11 yd. of braid at 6¢ a yard?

14. B and C start from the same place, and travel in opposite directions. B travels 5 miles an hour, and C 4 miles an hour. How far apart are they in 6 hours?

15. How many times can you fill an 8-gallon jug from a barrel that holds 48 gallons?

16. If you buy 38 cents worth of cloth, how much change will the clerk give you out of a half-dollar?

17. If you buy 4 cakes of soap at 7 cents a cake, how much must you pay for them?

ORAL.

1. A boy had 20 marbles, and lost 12, and then bought 4 times as many as remained. How many did he then have?

2. If you can walk 3 miles an hour, and your brother Fred can walk 5 miles an hour, how much farther can Fred walk in 12 hours than you can?

3. If you have been in school 60 days, how many weeks have you been in school if school keeps 5 days a week?

4. A man gave $60 for sheep, at the rate of $5 a head. How many did he buy?

5. How many melons at 7¢ each can be bought for 84 cents?

6. What is ⅓ of 9? 15? 30? 21? 36?

7. What is ¼ of 8? 20? 32? 48? 16?

8. What is ⅕ of 25? 45? 55? 30? 60?

9. What is ⅙ of 12? 42? 30? 18? 24?

10. If 4 oranges cost 24 cents, how much will 7 oranges cost?

11. If a man travels 15 miles in 3 hours, how far can he travel in 7 hours?

12. How many coats can be cut from 21 yd. of cloth, if 3 coats can be cut from 9 yards?

13. 7 is ¼ of what number?

14. ⅛ of a gallon of vinegar costs 2 cents, what will 1 gal. cost?

15. What will a barrel of oil cost, if ⅛ of a barrel cost $3?

16. If ½ of a pound of cheese cost 5 cents, how much will 2 pounds cost?

17. What will 1 gal. of molasses cost, if 4 gills cost 10 cents?

18. In 12 gallons, how many quarts? Pints?

19. In 3 quarts, how many pints? Gills?

1. Multiplication, involving "carrying."

24
6
24
12
144

Multiply 24 by 6.

6 times 4 units are 24 units, which equal 4 units and 2 tens. Write the units under units, and tens under tens. 6 times two tens are 12 tens, which are equal to 2 tens and 1 hundred. Write the tens in the column of tens, and the hundred in the column of hundreds. Now add, and your product is 144.

24
6
144

2. This shorter method should be taught as soon as the pupils understand the first method. Here we say 6 times 4 units are 24 units; write the 4 units, and keep the 2 tens for the tens column. 6 times 2 tens are 12 tens, and 2 tens make 14 tens.

Multiply:

1.	**2.**	**3.**	**4.**	**5.**	**6.**	**7.**	**8.**	**9.**	**10.**
28	32	46	54	66	73	27	64	49	67
6	5	7	6	5	4	5	6	7	6

Multiply:

11.	**12.**	**13.**	**14.**	**15.**	**16.**	**17.**	**18.**	**19.**	**20.**
25	35	48	56	64	78	85	98	39	84
6	4	2	3	4	7	5	6	7	6

Multiply:

21.	**22.**	**23.**	**24.**	**25.**	**26.**	**27.**	**28.**	**29.**	**30.**
23	81	19	42	37	49	61	88	75	64
6	4	3	5	2	3	7	6	5	5

Multiply:

31.	**32.**	**33.**	**34.**	**35.**	**36.**	**37.**	**38.**	**39.**	**40.**
17	38	47	55	68	92	77	82	45	72
3	6	4	7	5	6	2	5	5	6

46
53
74
13
16
173

This method in addition does away with the "carrying" explanation, and in adding long columns of figures is preferable, as it enables one to test each column separately.

1.	2.	3.	4.	5.	6.	7.	8.	9.
28	71	48	78	64	46	74	43	78
18	56	63	88	63	56	84	56	66
64	73	82	96	66	66	94	93	98

10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
27	48	75	76	47	45	33	47	59	68
36	26	81	86	36	65	78	63	68	78
45	35	96	63	81	75	96	72	77	45
73	38	74	91	45	95	75	95	66	75

20.	21.	22.	23.	24.	25.	26.	27.	28.	29.
78	45	64	14	27	75	76	84	16	16
66	32	73	25	17	86	95	76	28	45
74	28	86	86	46	94	17	93	35	73
85	78	91	97	53	73	42	65	92	82
93	99	29	75	68	87	15	78	83	69
65	26	47	88	89	96	89	75	71	78

30.	31.	32.	33.	34.	35.	36.	37.	38.	39.
21	63	44	64	16	51	63	50	16	45
45	57	36	51	34	50	21	29	34	52
16	91	82	37	13	15	57	71	73	23
75	36	33	23	11	29	45	14	81	20
35	86	55	45	32	12	91	97	13	31
45	31	74	51	35	71	16	29	32	61
86	62	14	72	47	21	36	69	24	99

1. Bought a barrel of pork for $21, and another for $18, and sold them both for $42. What was the gain?

2. If you spend 17 cents for candy, and 28 cents for a ball, how much will you have left from 50 cents?

3. George, who is 17 years old, is 7 years older than James, and 3 years younger than Harry. How old are James and Harry?

4. If a horse travels 7 miles in an hour, how far will he travel in 9 hours?

5. What will 4 doz. eggs cost at 11 cents for a half dozen?

6. A farmer sold 9 sheep at $5 each, and 5 lambs at $3 each. How much did he receive for them all?

7. I bought 11 yd. of cloth at $6 a yard, but in selling it I lost $18. For how much did I sell it?

8. How many yards of silk, at $5 a yard, can you buy for $45?

9. How many yards of silk, at $7 a yard, can you buy for $63?

10. What will 1 pound of nails cost, if 5 pounds cost 35 cents?

11. I had $54, and spent $\frac{1}{6}$ of it. How much had I left?

12. Take $\frac{1}{6}$ of 36 from $\frac{1}{7}$ of 49.

13. Take $\frac{1}{5}$ of 25 from $\frac{1}{6}$ of 42.

14. From $\frac{1}{4}$ of 32 take $\frac{1}{7}$ of 70.

15. What will 7 lb. of fish cost at 9¢ a pound?

16. If meat costs 16 cents a pound, and is sold for 20 cents, what will be gained in selling 11 pounds?

17. When 5 yd. cost 60 cents, what will 7 yd. cost?

18. At 20 cents a pound, what will $1\frac{1}{2}$ pounds of meat cost?

19. What is the distance around a book 12 in. long and 10 in. wide?

1. What will 8 pounds of tea cost, at 45 cents a pound?
2. What will 6 cakes of soap cost, at 25 cents a cake?
3. What will 7 pounds of tea cost, at 16 cents a pound?
4. George sold 9 hens at 40 cents each. How much money did he receive?
5. How many pecks are there in 64 quarts?
6. How many quarts are there in 7 pecks and 5 quarts?
7. If 9 cords of wood cost $36, what will 1 cord cost? What will 12 cords cost?
8. A farmer having 35 acres of land, gave away 12 of them; what is the rest worth at $9 an acre?
9. A car-conductor carried 17 passengers at 5¢ each, but lost 15 cents. How much had he left?

Add:

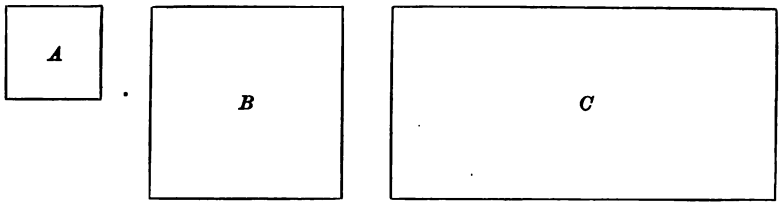
10.	11.	12.	13.	14.	15.	16.
13	23	12	32	32	34	52
22	32	20	23	21	45	34
20	12	10	21	13	54	53
31	23	22	11	13	52	44
12	21	23	12	30	53	25
21	12	12	21	22	45	34
23	13	21	13	22	34	41
32	31	13	31	11	35	22

Subtract:

17.	18.	19.	20.	21.	22.	23.
51	35	41	50	72	65	81
23	12	27	38	49	47	44

Subtract:

24.	25.	26.	27.	28.	29.	30.
34	43	54	71	92	31	85
17	34	37	56	48	16	67



1. Cut paper of the same size as A, B, and C.
2. How many times larger is B than A?
3. How many times larger is C than B?
4. C is how many times larger than A?
5. How many inches in the perimeter of A?
6. How many inches in the perimeter of B?
7. How many inches in the perimeter of C?
8. Draw the left diagonal in B.
9. Draw the right diagonal in C.
10. Into what is each divided by its diagonal?
11. Find the area of a rectangular flower-bed 8 feet by 6 feet.
12. Find the perimeter of a square table 6 ft. on each side.
13. Draw a rectangle that contains 28 square inches.
14. If a rectangle contains 32 sq. ft., and its length is 8 ft., how wide is it?
15. If a rectangle contains 24 sq. ft., and its width is 4 ft., what is its length?
16. Draw a square that contains 49 square inches.
17. Draw a rectangle that contains 30 square inches.
18. Find the number of square inches in 1 page of your book.
19. Find the number of square inches in your slate.
20. Find the number of square feet in the top of your desk.
21. Draw a square that contains 36 square inches.

ORAL.

1. Copy, fill blanks, and learn:

$1 \times 8 = ?$	$5 \times 8 = 40$	$9 \times 8 = 72$
$2 \times 8 = ?$	$6 \times 8 = 48$	$10 \times 8 = 80$
$3 \times 8 = ?$	$7 \times 8 = 56$	$11 \times 8 = 88$
$4 \times 8 = ?$	$8 \times 8 = 64$	$12 \times 8 = 96$

2. Find the cost of 1 dozen papers at 3¢ each.

3. If 1 bbl. holds 3 bu., how many bushels of apples will 7 bbl. hold?

4. John is 10 years old; his age is ½ his father's age. How old is his father?

5. 5 is what part of 25?

6. What is the cost of 9 yd. of silk, at $5 a yard?

7. Mr. Jones is 40 years old, and his son George is ⅛ as old. How old is George?

8. How many cents are there in ¾ of a dollar?

9. A hen had 12 chickens, and lost ¼ of them. How many chickens had she left?

10. If you had 32 marbles, and lost ¼ of them, how many did you lose?

11. How many inches in 4 feet?

12. How many pints in two quarts? In 6 qt.? In 10 qt.? In 12 qt.?

13. At 5¢ a pint, what will 2 qt. of coffee cost?

14. John has 24 marbles, which is twice as many as George has. How many has George?

15. When oil is worth 20 cents a gallon, how much can be bought for 5 cents?

16. How many months in ½ a year?

17. How many days in 3 weeks?

18. I bought 2 bbl. of apples for $5. What did I pay a barrel?

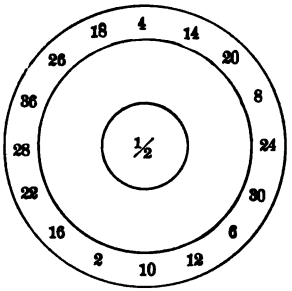
	a	*b*	*c*	*d*	*e*	*f*	*g*	*h*
1.	89	92	82	96	47	95	46	71
2.	26	87	93	48	63	64	98	58
3.	49	56	67	83	97	37	36	43
4.	76	66	85	67	68	44	72	84
5.	53	26	74	27	74	55	62	78

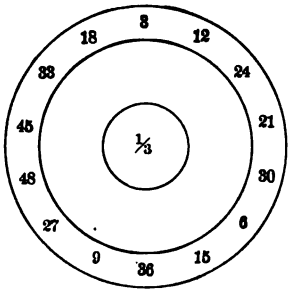
1. Multiply each number in each column by 4, 5, 6, 7, 8.
2. Add each column.

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	
a	4	8	7	4	9	6	8	5	4	7	6	8	9	4	*a*
b	7	4	8	6	2	5	2	7	8	4	5	3	2	7	*b*
c	5	6	7	8	7	4	6	4	3	5	7	8	9	6	*c*
d	6	5	4	3	5	7	5	6	8	7	5	4	2	4	*d*
e	8	4	5	6	4	5	7	3	4	3	8	9	8	8	*e*
f	4	6	8	7	6	4	3	8	7	9	5	4	6	7	*f*
g	6	7	9	4	8	7	8	5	6	2	8	7	5	6	*g*
h	9	5	6	8	7	6	5	4	5	6	7	8	6	8	*h*

3. Add the numbers in each line.
4. Add the numbers in each column.
5. Multiply the numbers in each line by 3, 4, 5, 6, 7, 8, 9.
6. Multiply line *a* by 6, and line *b* by 3, and subtract the products.
7. From the sum of *a*, *b*, and *c*, take the sum of *d* and *e*.
8. If more practice is needed, the teacher can make more examples by combining the numbers given by 2's or 3's, etc.

ORAL.





1. Kate cut an orange into 3 equal parts, and then gave away 2 of the parts. How much of the orange did she give away?

2. Divide 15 apples equally among 3 girls. What part of all the apples will each girl receive? How many apples will each girl receive?

3. What is ½ of 18? ⅓ of 18? ⅙ of 18?

4. Divide 15 apples equally among 4 boys. How many apples will each boy receive?

5. If you wish to divide an apple equally among 5 boys, into how many equal parts must you divide it?

6. If you divide 2 apples equally among 5 boys, how many fifths will you give to each boy?

7. If you divide a pear into 4 equal parts, and give Susie 2 of the parts, how many fourths will you give Susie? How many halves will you give her?

8. Divide an apple so that you can give ½ to John, and ⅓ to Mary. How many fifths will you have left?

9. What is ½ of 20? ⅓ of 10? ⅔ of 30?

10. If you had 36 marbles, and gave George ⅓ of them, John ¼, and Harry ⅙, how many marbles would you give to each of the boys, and how many would you have left?

11. Henry and Mary bought a melon for 8 cents. How much must each pay if they are to share equally?

Divide:

1.	2.	3.	4.	5.	6.	7.
2)4	3)6	2)12	4)16	6)36	5)30	7)35
8.	**9.**	**10.**	**11.**	**12.**	**13.**	**14.**
2)12	2)14	2)16	2)18	2)20	2)22	2)24
15.	**16.**	**17.**	**18.**	**19.**	**20.**	**21.**
3)9	3)12	3)15	3)18	3)21	3)30	3)33
22.	**23.**	**24.**	**25.**	**26.**	**27.**	**28.**
4)12	4)16	4)24	4)32	4)40	4)48	4)44
29.	**30.**	**31.**	**32.**	**33.**	**34.**	**35.**
5)15	5)25	5)40	5)35	5)50	5)60	5)45

	36.	**37.**	**38.**	**39.**	**40.**	**41.**	**42.**
Subtract:	42	82	84	62	44	86	53
	28	24	66	48	26	49	36

	43.	**44.**	**45.**	**46.**	**47.**	**48.**	**49.**
Subtract:	93	36	63	69	96	71	67
	36	29	39	36	48	58	39

	50.	**51.**	**52.**	**53.**	**54.**	**55.**	**56.**
Subtract:	84	61	24	35	41	85	92
	57	34	17	29	37	67	84

	57.	**58.**	**59.**	**60.**	**61.**	**62.**	**63.**
Subtract:	71	42	66	80	96	83	64
	38	18	47	56	77	66	55

ORAL.

1. Copy, fill blanks, and learn:

$1 \times 9 = ?$	$5 \times 9 = 45$	$9 \times 9 = 81$
$2 \times 9 = ?$	$6 \times 9 = 54$	$10 \times 9 = 90$
$3 \times 9 = ?$	$7 \times 9 = 63$	$11 \times 9 = 99$
$4 \times 9 = 36.$	$8 \times 9 = 72$	$12 \times 9 = 108$

2. How many quarts in 10 pints? 18 pints? 24 pints?

3. At 8¢ a quart, what will 7 quarts of berries cost?

4. At 9¢ a quart, what will 9 qt. of berries cost?

5. How many quarts in 1 peck? 3 pecks? 5 pecks?

6. How many pecks in 16 quarts? 32 quarts? 48 quarts?

7. What is the cost of a quart, if 1 peck costs 48 cents?

8. If you take 2 quarts of milk a day, at 6¢ a quart, how much will your milk cost you for a week?

9. If a man earns $12 a week, and spends $4 a week, how much will he save in 1 week? In 9 weeks?

10. If 8 sheep cost $72, what will 1 sheep cost?

11. How many square feet are there in 1 square yard? In 8 square yards?

12. If you received 18 cents for selling berries at 9¢ a quart, how many quarts did you sell?

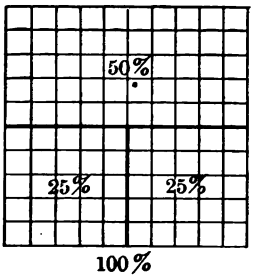
13. If a man earns $9 a day, how much will he earn in a week?

14. A boy lost 7 marbles, which was ⅛ of all he had. How many marbles had he at first?

15. In an orchard there are 7 rows of trees, and 9 trees in a row. How many trees are in the orchard?

16. How much must you pay, if you buy 7 yards of cloth at 9¢ a yard?

17. A farmer had 9 sheep in each of six pastures, but he has sold 6 from 1 pasture, 7 from another, 8 from another, and 9 from another; how many sheep has he now?



1. Into how many parts is the square divided?

2. What will 1 part be called?

3. Make a square and divide it into 100 equal parts.

4. Point to $\frac{1}{100}$ of your square.

5. Point to $\frac{18}{100}$ of it.

6. Cross off 25 parts, or $\frac{25}{100}$ of the whole square.

7. Can you tell by looking what part of the whole square you have crossed off?

8. Then $\frac{1}{4}$ is how many $\frac{1}{100}$?

9. Instead of saying 25 one hundredths, we say 25 per cent; because per cent means "by the hundred."

10. Look at the square at the top of the page, and see how we write per cent. Write 25%.

11. Draw a rectangle 4 in. by 1 in. Cross off 25% of it.

12. Look at the square at the top of the page, and tell what part of the square is 50% of it.

13. 50% of a square is —— of it?

14. Draw a line 4 in. long. Cross off 50% of it. 25% of it. 100%.

15. What part of a circle is 100% of it? 50% of it? 25% of it?

16. $\frac{1}{2}$ of a circle is what per cent of it?

17. $\frac{1}{4}$ of a circle is what per cent of it?

18. Which is larger, 25% of an orange, or 50% of it?

19. What is 25% of 16 cents? 100% of 25 cents?

20. What is 50% of 16 cents? Of 24 cents?

21. What is 25% of \$12? \$48? \$32?

22. What is 50% of \$10? Of \$18? \$40?

23. What is 50% of \$100? Of \$60? \$1?

24. What is 25% of \$4? Of \$1? \$100?

25. Make an example using 25%. Make one using 50%.

ORAL.

1.	2.	3.	4.
$\frac{1}{2}+\frac{1}{2}=?$	$\frac{1}{4}+\frac{1}{4}=?$	$\frac{2}{4}+\frac{2}{4}=?$	$\frac{1}{5}+\frac{1}{5}=?$
$\frac{1}{3}+\frac{1}{3}=?$	$\frac{1}{4}+\frac{2}{4}=?$	$\frac{2}{4}+\frac{1}{4}=?$	$\frac{2}{5}+\frac{2}{5}=?$
$\frac{1}{3}+\frac{2}{3}=?$	$\frac{1}{4}+\frac{3}{4}=?$	$\frac{3}{4}+\frac{1}{4}=?$	$\frac{3}{5}+\frac{3}{5}=?$

5.	6.	7.	8.
$\frac{1}{5}+\frac{3}{5}=?$	$\frac{1}{6}+\frac{5}{6}=?$	$\frac{2}{6}+\frac{4}{6}=?$	$\frac{1}{6}+\frac{4}{6}=?$
$\frac{1}{5}+\frac{4}{5}=?$	$\frac{1}{6}+\frac{3}{6}=?$	$\frac{2}{6}+\frac{2}{6}=?$	$\frac{1}{6}+\frac{2}{6}=?$
$\frac{3}{5}+\frac{1}{5}=?$	$\frac{1}{6}+\frac{1}{6}=?$	$\frac{2}{6}+\frac{1}{6}=?$	$\frac{2}{6}+\frac{3}{6}=?$

9.	10.	11.	12.
$\frac{8}{8}-\frac{1}{8}=?$	$\frac{8}{8}-\frac{4}{8}=?$	$\frac{8}{8}-\frac{7}{8}=?$	$\frac{6}{8}-\frac{3}{8}=?$
$\frac{8}{8}-\frac{2}{8}=?$	$\frac{8}{8}-\frac{5}{8}=?$	$\frac{7}{8}-\frac{3}{8}=?$	$\frac{6}{8}-\frac{4}{8}=?$
$\frac{8}{8}-\frac{3}{8}=?$	$\frac{8}{8}-\frac{6}{8}=?$	$\frac{7}{8}-\frac{5}{8}=?$	$\frac{6}{8}-\frac{1}{8}=?$

13.	14.	15.	16.
$1-\frac{7}{8}=?$	$1-\frac{1}{2}=?$	$1-\frac{1}{3}=?$	$1-\frac{4}{8}=?$
$1-\frac{5}{6}=?$	$1-\frac{4}{6}=?$	$1-\frac{2}{3}=?$	$1-\frac{3}{8}=?$
$1-\frac{2}{3}=?$	$1-\frac{4}{5}=?$	$1-\frac{1}{5}=?$	$1-\frac{6}{6}=?$

17.	18.	19.	20.
$\frac{1}{2}=\frac{}{4}$	$\frac{1}{2}=\frac{}{6}$	$\frac{2}{2}=\frac{}{4}$	$\frac{2}{4}=\frac{}{8}$
$\frac{1}{3}=\frac{}{6}$	$\frac{1}{3}=\frac{}{9}$	$\frac{3}{3}=\frac{}{9}$	$\frac{3}{4}=\frac{}{8}$
$\frac{1}{4}=\frac{}{8}$	$\frac{1}{2}=\frac{}{8}$	$\frac{2}{3}=\frac{}{6}$	$\frac{4}{4}=\frac{}{8}$

Put in the proper signs with the following numbers:

21.	7	4	28.	**22.**	3	3	9.	**23.**	7	2	14.
24.	12	4	3.	**25.**	14	7	2.	**26.**	6	6	0.
27.	6	5	11.	**28.**	5	3	15.	**29.**	10	2	5.
30.	9	6	3.	**31.**	14	8	6.	**32.**	4	4	16.
33.	5	9	14.	**34.**	5	8	13.	**35.**	15	10	5.
36.	6	8	14.	**37.**	12	3	36.	**38.**	42	7	6.
39.	17	9	8.	**40.**	8	7	56.	**41.**	27	9	3.

1. John had 80 marbles, and lost 25% of them. How many did he lose? How many did he have left?

2. Mary had 60 cents, and spent 50% of them. How many did she spend? How many did she have left?

3. A farmer had 50 sheep, and lost 50% of them. How many had he left?

4. A man had $400, and spent 25% of it, and put 50% of it in the bank. How much money did he spend? How much did he put in the bank?

5. A farmer had 80 chickens, but a hawk caught 25% of them. How many did the hawk catch? How many did the farmer have left?

6. A had $200; B had 50% as much. How much had B?

7. A coat that cost $18 was sold at a loss of 50%. How much was lost? For how much was the coat sold?

8. A man bought a cow for $20, and sold it so as to gain 25%. How much did he gain? For how much did he sell the cow?

9. If you had 20 cents, and spent 10 cents, what part of your money did you spend? What per cent of it did you spend?

10. Ida spent 6 cents, which was 25% of all she had. How much money had she?

12. In an orchard there are 60 trees. If 25% of them are apple trees, how many apple trees are there?

13. Draw a rectangle 10 in. by 4 in. Cross off 50% of it. Cross off 25% of what is left.

14. Find 25% of $800; of $100; $36; $16; $48.

15. Find 50% of 200; of 60; 24; 18; 20; 400.

16. A regiment of 800 men lost 25% of its men in battle. How many men did it lose?

17. A farmer had 120 sheep, and sold 25% of them. How many sheep did he have left?

ORAL.

1. A boy spent 11¢ for candy, 9¢ for a ball, and 5¢ for a top. How many cents did he spend in all?

2. James bought a pigeon for 9¢, a squirrel for 10¢, and a rabbit for 12¢. How much did all cost?

3. In a class of 39 pupils, 25 were present. How many were absent?

4. If you buy a ball for 6 cents, for how much must you sell it to gain 4 cents?

5. What will 3 oranges cost at 6 cents each?

6. What will 4 ounces of cloves cost at 8¢ an ounce?

7. At 7 cents each, what will 9 pineapples cost?

8. If a stage-coach goes 9 miles in an hour, how far will it go in 9 hours?

9. How many barrels of flour, at $5 a barrel, can be bought for $20?

10. For $54, how many barrels of flour can be bought at $6 a barrel?

11. A man traveled 7 miles in an hour. At the same rate, how long would it take him to travel 63 miles?

12. At 7¢ a pound, how many pounds of fish can be bought for 84 cents?

13. 3 is ¼ of what number? 7 is ⅛ of what number?

14. If ⅔ of a melon costs 4 cents, what will 1 melon cost?

15. Find the cost of 3 pints of milk at 8¢ a quart.

16. If a piece of ribbon 6 in. long costs 4 cents, what will a piece 2 ft. long cost?

17. What is 25% of 12? 20? 36? 48? 40? 16?

18. What is the distance around a square room 10 feet on a side?

19. Sight addition:

7	6	9	9	8	7	7	8	9	9
8	7	6	5	5	7	5	6	8	9

DIVISION.

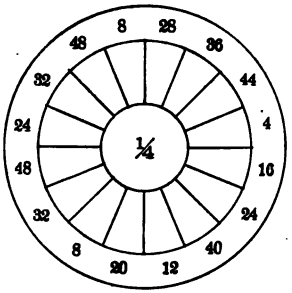
$4\overline{)72}^{3}$ $\quad 18$

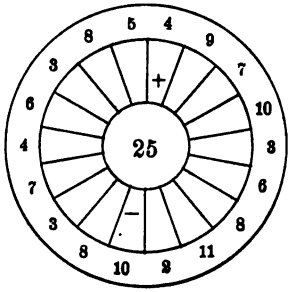
Four is contained in 7 tens, one ten times, and three tens over. Three tens are 30 units, and 2 units make 32 units. 4 is contained in 32 units 8 units times.

For a few weeks allow the pupils to write the first remainder, as 3 in the illustrative example. All division, where the divisor is a single figure, should be done by short division.

1.	**2.**	**3.**	**4.**	**5.**	**6.**	**7.**
3)45	4)52	5)65	6)84	7)91	8)96	9)108
8.	**9.**	**10.**	**11.**	**12.**	**13.**	**14.**
3)51	3)48	3)54	3)72	3)84	3)87	3)96
15.	**16.**	**17.**	**18.**	**19.**	**20.**	**21.**
4)52	4)60	4)68	4)72	4)92	4)100	4)64
22.	**23.**	**24.**	**25.**	**26.**	**27.**	**28.**
5)65	5)75	5)85	5)70	5)90	5)80	5)85
29.	**30.**	**31.**	**32.**	**33.**	**34.**	**35.**
6)66	6)72	6)84	6)78	6)90	6)96	6)102
36.	**37.**	**38.**	**39.**	**40.**	**41.**	**42.**
7)70	7)84	7)91	7)105	7)98	7)210	7)154
43.	**44.**	**45.**	**46.**	**47.**	**48.**	**49.**
8)64	8)80	8)96	8)128	8)104	8)256	8)72
50.	**51.**	**52.**	**53.**	**54.**	**55.**	**56.**
9)99	9)108	9)216	9)162	9)378	9)252	9)126

ORAL.





1. Lucy's mother gave her 50 cents, and she spent 30 cents. How much money had she left?
2. How many feet in 18 inches?
3. Draw an oblong which is 16 inches round it.
4. If ribbon costs 2 cents a foot, how many yards can you buy for 18 cents?
5. Nine pints are how much more than a gallon?
6. How many quarts in 18 pints?
7. At 3¢ a pint, what will 6 qt. of milk cost?
8. If 1 lb. of sugar costs 8¢, what will ½ lb. cost?
9. If 1 lb. of sugar costs 8¢, what will 50% of a pound cost?
10. Seventeen is how many less than 1½ doz.?
11. If ½ a peck of plums costs ½ a dollar, what will 1 peck cost?
12. What will 2 bu. of grass-seed cost at $2 a peck?
13. How many sides have 7 triangles?
14. How many faces have 7 cubes?
15. Ned has 6 qt. of strawberries. How many pint baskets can he fill?
16. George had 34 marbles, but lost half a dozen. How many has he left?
17. Our front hall is 40 in. wide. How much wider is that than carpet 1 yard wide?

When dollars and cents are written together, the cents are separated from the dollars by a point. Thus: Three dollars and sixty-five cents are written, $3.65.

Write the following:

1. One dollar and forty-two cents.
2. Six dollars and seventy-five cents.
3. Four dollars and thirty-one cents.
4. Sixty dollars and fifty cents.
5. Eighty-three dollars and forty-nine cents.
6. Seven dollars and fifteen cents.
7. Eleven dollars and twenty-two cents.
8. Twenty-four dollars and twenty cents.
9. Sixteen dollars and thirty-five cents.

Read the following:

10. $4.66. $5.55. $ 2.84. $3.61. $11.26. $21.48.
11. $6.05. $7.02. $16.71. $4.88. $ 4.17. $ 5.23.

12. Write the sums of money in Example 11, one under the other, and add them. Be sure that in writing them you keep the points under each other.

Add:

13.	14.	15.	16.	17.
$1.50	$2.78	$3.74	$4.62	$9.99
2.65	4.63	5.62	7.28	7.43
5.85	9.18	7.91	8.36	6.12

Subtract:

18.	19.	20.	21.	22.
$9.64	$6.41	$1.26	$8.51	$5.25
7.32	3.38	0.45	4.37	4.75

Subtract:

23.	24.	25.	26.	27.
$7.19	$5.72	$7.11	$6.49	$8.42
4.76	2.95	4.08	3.58	4.68

ORAL.

1. What is the area of a rectangle 7 in. by 6 in.?
2. What is the area of a 9 in. square?
3. What is the area of a sidewalk 20 ft. long and 4 ft. wide?
4. How do you find the cost of 10 apples, when you know the cost of one?
5. How do you find the cost of 1 apple, when you know the cost of 10 apples?
6. Make examples to illustrate the 4th and 5th questions.
7. In 10 ft. there are —— yd. and —— ft.
8. In 16 ft. there are —— yd. and —— ft.
9. In 22 ft. there are —— yd. and —— ft.
10. In 29 ft. there are —— yd. and —— ft.
11. Take a string, and cut off 16½ ft. This string is 1 rod long.
12. Learn: 16½ ft. make 1 rod.
13. Make two crosses on the floor that you think are 1 rod apart. Take your string and measure, to see how accurately you have guessed.
14. How many times will 48 oranges fill a fruit dish that holds 1 dozen oranges?
15. What will 7 rulers cost, at 9¢ each?
16. Name all the odd numbers between 20 and 40.
17. Name all the even numbers between 40 and 60.
18. Make a problem for 4×8. For $\frac{1}{3}$ of 15.
19. Make a problem for $12 + 6 - 7$.
20. If 42 apples are divided equally among 7 boys, how many apples will each boy receive?
21. There were 88 persons in a room. How many were left after 48 had gone out?
22. I paid $20 for 5 yd. of cloth; how much did I pay for a yard?

NOTE. — Place on each pupil's desk a box or some cubes, to be piled into a rectangular prism. Let the pupils measure each dimension; then make something like the following:

Length of one side —— inches.
Height of one side —— inches.
Area of one side —— square inches.
Area of the two sides —— square inches.
Width of one end —— inches.
Height of one end —— inches.
Area of one end —— square inches.
Area of the two ends —— square inches.
Length of the top —— inches.
Width of the top —— inches.
Area of the top —— square inches.
Area of top and bottom —— square inches.
Area of all six sides —— square inches.

NOTE. — Do not give the dimensions to the pupils; let them find them by measuring. As boxes usually have fractions in their dimensions, it may be better at this stage to have prisms made for the purpose, or built from small cubes. Give directions for building as follows:

Build a prism 4 blocks long, 3 blocks wide, 2 blocks high.

Multiply:

1.	**2.**	**3.**	**4.**	**5.**	**6.**	**7.**	**8.**
57	67	34	65	68	27	85	76
3	2	4	5	3	7	2	3

Multiply:

9.	**10.**	**11.**	**12.**	**13.**	**14.**	**15.**	**16.**
94	38	60	86	78	47	64	73
5	6	9	5	9	7	6	8

Multiply:

17.	**18.**	**19.**	**20.**	**21.**	**22.**	**23.**	**24.**
72	83	98	73	63	37	79	98
6	7	9	9	7	7	5	5

ORAL.

1. Fill the blanks:

$1 = \frac{}{2}$	$1 = \frac{}{5}$	$1 = \frac{}{9}$	$2 = \frac{}{3}$	$2 = \frac{}{5}$
$1 = \frac{}{3}$	$1 = \frac{}{8}$	$1 = \frac{}{10}$	$2 = \frac{}{3}$	$2 = \frac{}{8}$
$1 = \frac{}{4}$	$1 = \frac{}{8}$	$1 = \frac{}{12}$	$2 = \frac{}{4}$	$2 = \frac{}{9}$

2. An orchard has 56 trees in 7 rows. How many trees are in a row?

3. How many hats, at $6 each, can be bought for $54?

4. How many bushels are there in 56 pecks?

5. How many pecks in 72 quarts?

6. How many sheep, at $9 a head, can be bought for $63.

7. If a man walks 3 miles an hour, how many hours will it take him to walk 33 miles?

8. A schoolroom contains 35 desks; there are 5 rows. How many desks are there in each row?

9. A man was 18 half-days in building a wall. How many days did he work?

10. A boy gave $\frac{1}{4}$ of an orange to his sister, $\frac{1}{4}$ to his brother, $\frac{1}{4}$ to his playmate, and ate $\frac{1}{4}$. How much of the orange did he have left?

11. Charlie had $\frac{2}{3}$ of an apple, and gave $\frac{1}{3}$ to his sister. How many thirds had he left?

12. How many gallons in 36 quarts? 48 quarts?

13. A boy found 21 eggs in the barn. He put them in his hat to carry into the house, but fell and broke some. If he had $1\frac{1}{2}$ doz. when he reached the house, how many did he break?

14. There are 13 men in one car and 5 in another. How many men are in both cars? How many more men in one car than in the other?

15. If seven men can do a piece of work in 9 days, how many men will it take to do the same work in 1 day?

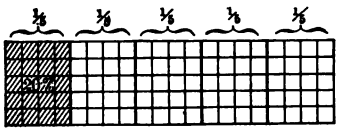


Fig. 1.

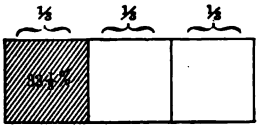


Fig. 2.

How many little squares in Fig. 1? How many are crossed off? If 20 parts out of 100 parts are crossed off, what per cent is crossed off? What is $\frac{1}{5}$ of 100%?

Into how many parts is Fig. 2 divided? What part of the whole is crossed off? What is $\frac{1}{3}$ of 100%?

1. What part of the whole rectangle is 20% of it?
2. What part of the whole rectangle is 33⅓% of it?
3. What is 33⅓% of $12? $18? $27?
4. What is 20% of $15? $25? $35?
5. What is 25% of 80 quarts? Of 64 gal.? $120?
6. What is 50% of 400 books? Of $150? 78 pencils?
7. What is 33⅓% of 99 horses? Of $66? Of 300 men?
8. What is 20% of 100 chickens? Of 80 books?
9. What is 20% of 50? 100? 135?
10. If you had 75¢, and should spend 33⅓% of it, how many cents would remain?
11. Find 33⅓% of 333. Find 25% of 444.
12. Find 20% of 555. Find 100% of 100.
13. $5\overline{)96}$ $19,1$ In this example we have a remainder of 1. As 1 is $\frac{1}{5}$ of the divisor, the quotient is usually written $19\frac{1}{5}$.

14.	15.	16.	17.	18.	19.
$6\overline{)38}$	$7\overline{)50}$	$8\overline{)98}$	$5\overline{)72}$	$4\overline{)94}$	$4\overline{)106}$

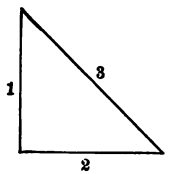
20.	21.	22.	23.	24.	25.
$7\overline{)52}$	$6\overline{)97}$	$9\overline{)92}$	$5\overline{)86}$	$8\overline{)99}$	$4\overline{)142}$

ORAL.

1. Name the spring months.
2. Name the fall months.
3. Repeat the table of Time Measure.
4. How many hours in $\frac{1}{2}$ a day?
5. How many hours from noon till midnight?
6. How many hours from 9 A.M. till 4 P.M.?
7. How many hours from 10 A.M. till 10 P.M.?
8. How many hours in $\frac{1}{4}$ of a day?
9. How many minutes in $\frac{1}{4}$ of an hour?
10. How many weeks in a fortnight?
11. How many days in 2 wk. 5 da.?
12. How many days in 3 wk. 4 da.?
13. How many weeks in 1 yr. 3 wk.?
14. How many months in 2 yr. 4 mo.?
15. How many seconds in $1\frac{1}{4}$ minutes?
16. How many minutes in $1\frac{1}{4}$ hours?
17. How many hours from 9.30 o'clock A.M. to 2 o'clock P.M.
18. How many days from June 1 to June 26?
19. How many days from July 28 to Aug. 5?
20. If you divide 36 marbles equally among 6 boys, how many marbles will 2 boys have?
21. A bookseller had 28 arithmetics, and sold $\frac{1}{4}$ of them. How many had he left?
22. $(\$6 \times 9) - (\$7 \times 7) =$ how many dollars?
23. If a farmer, who had 56 bu. of corn, uses 8 times 6 bu., how many does he have left?
24. If a sofa costs \$32, and a centre table \$25, what is the difference in price?
25. At 4¢ a pint, what will 1 gal. of molasses cost?
26. At 5¢ a gill, what will 3 pt. of syrup cost?
27. When $\frac{2}{3}$ of a box of oranges cost \$4, what will $\frac{1}{3}$ of a box cost? What will a whole box cost?

1. Take a 4-inch square and fold it on its diagonal. What form have you now? What part of the square is your right-triangle?

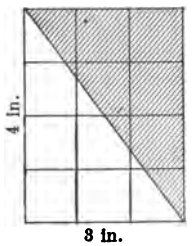
2. What was the area of your square? What then must be the area of the triangle?



1 is called the altitude.
2 is called the base.
3 is called the hypothenuse.

3. Draw a right-triangle. Write the names of its sides.

4. Draw a right-triangle with a base of 3 inches and an altitude of 4 inches. Find its area.



How many square inches in one row in this rectangle?

How many rows?

3 sq. in. × 4 = what?

If the triangle is one-half of the rectangle, how many square inches does the triangle contain?

4. Illustrate and find area of triangles having the following dimensions: —

a. Altitude 8 inches, base 6 inches.
b. Altitude 10 inches, base 8 inches.
c. Altitude 4 inches, base 4 inches.
d. Altitude 6 inches, base 6 inches.
e. Altitude 8 inches, base 7 inches.
f. Altitude 5 inches, base 8 inches.
g. Altitude 9 inches, base 6 inches.
h. Altitude 10 inches, base 10 inches.
i. Altitude 7 inches, base 6 inches.
j. Altitude 5 inches, base 3 inches.
k. Altitude 7 inches, base 5 inches.
l. Altitude 8 inches, base 9 inches.
m. Altitude 12 inches, base 12 inches.

ORAL.

1. Frank saw 8 cows in one pasture and 12 in another. How many more cows did he see in one pasture than in the other? How many cows did he see in both pastures?

2. A butcher bought calves at $7 a head. How many did he buy for $28?

3. At $7 a barrel, what are 8 bbl. of flour worth?

4. How many days are there in 9 weeks?

5. How many days are there from Sept. 15 to Oct. 10?

6. How much will $\frac{1}{2}$ pound of candy cost, at 2¢ an ounce?

7. If there are 4 sq. in. in the face of a cube, how many sq. in. are there in all the faces?

8. If the base of a right-triangle is 4 in. and its altitude 5 in., what is its area?

9. Draw a circle on the board, and put in its diameter.

10. Give the abbreviations for the following words: foot, inch, ounce, barrel, year.

11. $\frac{1}{6}$ of a dozen eggs is how many eggs?

12. 9 oysters have how many shells?

13. How many pages in a book of 12 leaves?

14. If you had a quarter of a dollar, and spent $\frac{1}{5}$ of your money, how much did you spend?

15. If you had a quarter of a dollar, and spent 20% of your money, how much did you spend?

16. Count by 8's to 96. Count by 6's to 72.

17. How many ninths in $\frac{1}{3}$?

18. How many minutes in $\frac{1}{2}$ an hour?

19. Which is the larger, $\frac{1}{5}$ or $\frac{1}{10}$ of an orange?

20. Which is the larger, $\frac{3}{8}$ or $\frac{1}{3}$ of an apple?

21. Frank has $18. His father gave him $\frac{1}{3}$ of it. His mother gave him $\frac{1}{6}$ of it. His grandmother gave him $\frac{1}{2}$ of it. Frank earned the rest. How much did he earn? and how much did each give him?

1. Find the area of a room that is 2 rods long and 9 ft. wide.

2. At 10 cents a dozen, what will 60 apples cost?

3. How many pints in 62 quarts?

4. Buy 2 watches at $17 each and 4 watches at $15 each. How much do they all cost? Sell them all at $16 each. How much do you gain?

5. Measure the schoolroom door, and find its area.

6. Find the cost of the following articles,

a. 19 yards calico @ 6¢.
b. 9 gal. oil @ 15¢.
c. 17 lb. sugar @ 7¢.
d. 3 lb. meat @ 18¢.
e. 9 lb. pork @ 13¢.

7. Separate 84 books into 4 piles.

8. Separate $63 into 7 piles.

9. A farmer had 26 sheep in one field, and 19 in another, and in another enough to make his number 59. How many had he in the 3d field?

10. John has 33 marbles and Albert 25. How many marbles must John give Albert that both may have the same sum? How many would each have?

11. A man bought some sugar for $51, and paid $3 for freight. For how much must he sell it to gain $10?

12. Two men start from the same place, and travel in the same direction. One travels at the rate of 8 miles an hour, the other 11 miles an hour. How far apart will they be at the end of 20 hours?

13. What is the cost of 9 cows, at $25 each?

14. How much will 19 pencils cost, at 5¢ each?

15. If 9 yd. of cloth cost $53, for how much must it be sold a yard to gain $10?

16. In a box were 85 oranges. If the box would hold 125, how many more oranges will it take to fill it?

ORAL.

1. A cooper made 48 pails, and sold $\frac{1}{3}$ of them. How many had he left?

2. There are 6 cows in 1 field, and 4 times as many in another field. How many cows are there in the two fields?

3. Bessie is 6 years old. How old will she be in 12 years?

4. If 2 pencils cost 6 cents, how many pencils can you buy for 15 cents?

5. When oranges are 12 cents a half dozen, how many oranges can you buy for 24 cents?

6. When $\frac{1}{2}$ a pound of sugar costs 3 cents, what will $3\frac{1}{2}$ pounds cost?

7. What is $\frac{1}{7}$ of 7? Of 21? 14?

8. What is $\frac{1}{9}$ of 9? Of 18? 27? 36?

9. A foot is what part of a yard?

10. An inch is what part of a foot?

11. How long will a bushel of potatoes last, if 4 quarts are used each day?

12. How many days are there between Thursday of this week and Wednesday of next week?

13. At \$2 a peck, what will 2 bushels of berries cost?

14. At 63¢ a yard, what is $\frac{1}{9}$ of a yard of cloth worth?

15. How many fourths are there in 3 pears?

16. If $\frac{1}{4}$ of a yard of cloth costs 8 cents, how much will $\frac{3}{4}$ cost?

17. If you have $\frac{4}{7}$ of a pound of candy, and give away $\frac{3}{7}$ of a pound, how much will you have left?

18. If 4 oranges cost 12 cents, what will 5 oranges cost?

19. If a railroad car has 8 wheels, how many cars will 40 wheels supply?

20. How many days will it take a man to work 48 hours, if he works eight hours a day?

21. How many pecks are there in 56 quarts?

1. A mixed number is a whole number and a fraction united, as, $2\frac{1}{3}$, $4\frac{1}{6}$, etc.

2. Write 10 mixed numbers.

3. The following diagram illustrates the way to change mixed numbers to fractional forms.

a. How many halves are there in the first square below?

b. How many halves are there in the second square?

c. How many halves are there in the third?

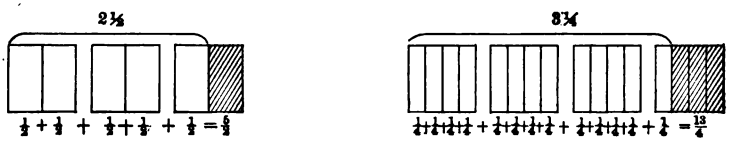
d. Why do we cross off $\frac{1}{2}$ of the third square?

e. If each square represents a unit, how many units are represented below?

f. If there are two halves in each unit, how many halves are there in the 2 units?

g. How many halves are there then in $2\frac{1}{2}$?

h. In the other figure how many fourths are there in one square? In three squares? In $3\frac{1}{4}$ squares?



4. Change and illustrate as above:

$2\frac{1}{3}$ $4\frac{1}{2}$ $5\frac{1}{3}$ $2\frac{1}{8}$ $2\frac{3}{5}$ $1\frac{1}{5}$ $2\frac{3}{4}$ $1\frac{5}{8}$ $2\frac{3}{5}$ $2\frac{3}{4}$

5. Change and illustrate as above:

$3\frac{1}{5}$ $2\frac{1}{8}$ $3\frac{3}{8}$ $4\frac{9}{10}$ $3\frac{1}{4}$ $2\frac{1}{6}$ $1\frac{3}{16}$ $2\frac{9}{2}$ $3\frac{3}{3}$ $4\frac{3}{8}$

6. Change the following numbers to halves, and illustrate: 2 4 6 9 3 7 5 1 8 10

7. Change to thirds and illustrate:

4 7 6 5 8 9 2 1 10 3

8. Change to fourths and illustrate:

9 7 5 3 1 10 8 6 4 2

ORAL.

1. What is 20% of $15?

2. A boy had 20 marbles, and lost 25% of them. How many did he lose?

3. What is 50% of ten?

4. What is 33⅓% of 27 cents?

5. The three sides of a triangle are 6 inches, 8 inches, and 10 inches. What is the distance round the triangle?

6. How many feet in a rod?

7. Clinton has 7 chickens, George has nine, and Henry has 8. How many have they all together?

8. There were 17 books on a shelf. If you should put 9 more there, and then take down 11, how many books would be left on the shelf?

9. How many square inches in a right-triangle whose base is 8 inches and altitude 4 inches?

10. What will 10 cords of wood cost at $6 a cord?

11. How many quarts in 7 pecks?

12. How many inches in 8 feet?

13. 17 boys are 9 more than how many boys?

14. A girl who had 21 oranges gave away 8 of them. How many had she left?

15. If 7 oranges cost 21 cents, how much will 9 cost?

16. How many times 7 are 8 times 6?

17. A man sold 7 sheep at $5 each, and lost $7. How much did they cost?

18. What do 7 pairs of shoes cost at $6 a pair?

19. What do 8 pairs of boots cost at $5 a pair?

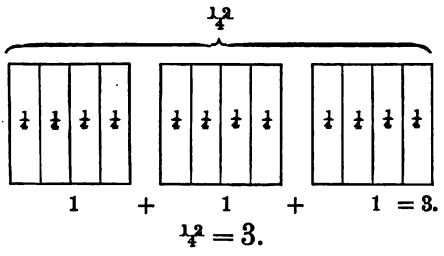
20. What will 7 pencils cost at 5 cents each?

21. If you have $5, and earn $7 more at one time and $6 more at another, how much will you have?

22. There were 16 girls in a party after 9 had gone home. How many were there at first?

23. How many sheep at $6 a head can be bought for $54?

To reduce fractional forms to whole or mixed numbers.



$\frac{12}{4} = 3.$



$\frac{5}{2} = 2\frac{1}{2}.$

1. Change and illustrate:

$\frac{6}{3}$, $\frac{8}{4}$, $\frac{12}{6}$, $\frac{12}{4}$, $\frac{16}{8}$, $\frac{12}{3}$, $\frac{12}{2}$, $\frac{9}{3}$, $\frac{15}{3}$, $\frac{16}{4}$.

2. Change and illustrate:

$\frac{6}{5}$, $\frac{11}{4}$, $\frac{8}{8}$, $\frac{13}{4}$, $\frac{17}{5}$, $\frac{7}{3}$, $\frac{11}{5}$, $\frac{13}{3}$, $\frac{12}{5}$, $\frac{10}{8}$.

3. Change and illustrate:

$3\frac{1}{2}$, $4\frac{2}{3}$, $5\frac{1}{6}$, $4\frac{3}{4}$, $3\frac{1}{5}$, $\frac{9}{8}$, $\frac{9}{5}$, $\frac{10}{3}$, $\frac{10}{6}$, $\frac{11}{6}$.

4. 7 times $\frac{1}{8}$ of 24 are how many?

5. Charles found 20 cents, and spent one fourth of it. How much money had he left?

6. Rewrite this example, using per cent in place of the fraction.

7. How many units (whole ones) in $\frac{15}{5}$?

8. How many fourths in 4?

9. Change to units:

$\frac{8}{2}$, $\frac{10}{5}$, $\frac{18}{6}$, $\frac{36}{6}$, $\frac{42}{7}$, $\frac{84}{8}$, $\frac{27}{9}$, $\frac{45}{9}$, $\frac{56}{8}$, $\frac{49}{7}$.

10. Change to units:

$\frac{33}{11}$, $\frac{24}{8}$, $\frac{36}{12}$, $\frac{48}{24}$, $\frac{40}{8}$.

11. Change to fractional forms:

$6\frac{2}{3}$, $8\frac{1}{3}$, $5\frac{1}{4}$, $3\frac{2}{3}$, $5\frac{1}{4}$, $6\frac{3}{4}$.

12. Change to mixed numbers:

$\frac{9}{4}$, $\frac{11}{3}$, $\frac{8}{8}$, $\frac{13}{4}$, $\frac{17}{4}$.

ORAL.

1. 5 times 9 and $\frac{1}{3}$ of 9 are how many?
2. $\frac{1}{4}$ of 20 is $\frac{1}{5}$ of what number?
3. 5 times $\frac{1}{4}$ of 12 are how many?
4. 7 times $\frac{1}{10}$ of 40 are how many?
5. 9 times $\frac{1}{3}$ of 27 are how many?
6. 4 times $\frac{1}{3}$ of 9 are how many?
7. If 8 chairs cost \$32, what will 9 chairs cost?
8. If 5 chairs cost \$20, what will 8 chairs cost?
9. Which is the greater, $\frac{1}{3}$ of 15 or $\frac{1}{5}$ of fifteen?
10. $\frac{1}{5}$ of 10 plus $\frac{1}{6}$ of 12 plus $\frac{1}{8}$ of 16 are how many?
11. $\frac{1}{4}$ of 12 plus $\frac{1}{5}$ of 20 plus $\frac{1}{6}$ of 12 are how many?
12. $\frac{1}{4}$ of 8 plus $\frac{1}{5}$ of 10 plus $\frac{1}{4}$ of 12 are how many?
13. 3 is $\frac{1}{10}$ of what number?
14. $\frac{1}{2}$ of 20 plus $\frac{1}{4}$ of 20 are how many?
15. $\frac{1}{3}$ of 12 plus $\frac{1}{4}$ of 12 are how many?
16. Jane gave away $\frac{1}{5}$ of all her jackstones. How many jackstones did she give away, if she had 25 at first?
17. A man had \$28, and spent $\frac{1}{7}$ of it. How many dollars did he spend?
18. If a man should walk 120 miles in 12 days, how many miles would he walk in 4 days at the same rate?
19. A lady bought 12 yd. of muslin at 8¢ a yard. How much did it cost her?
20. A hardware dealer paid \$60 for 12 kegs of nails. What was the price of 1 keg?
21. How many dozen buttons can be bought for 88 cents, at the rate of 8¢ a dozen?
22. What will 7 napkins cost, at 7¢ each?
23. Find the cost of 1 lead pencil, when 11 pencils cost 22 cents.
24. How many lemons in 8-fourths of a lemon?
25. How many pounds in 28-sevenths of a pound?
26. How many fifths in $3\frac{3}{5}$?

1. In Mr. Brown's farm, there are 125 acres; and in Mr. Hale's farm, there are 269 acres. How many acres in both farms? How many more acres has Mr. Hale than Mr. Brown?

2. How many barrels, each holding 3 bu., will be required to hold 153 bushels?

3. If a man travels 315 miles in 9 days, how far will he travel in 1 day?

4. If you start with 75, and subtract 5 from it, and 5 from that remainder, and so continue till there is no remainder, how many times do you subtract 5?

5. A sidewalk is 40 ft. long and 5 ft. wide. How many square feet are there in it?

6. A man's pasture is 60 rods long and 40 rods wide. How many rods is it round his pasture?

7. How many weeks in September, October, and November?

8. Name the months that have 31 days.

9. How many days from July 13 to September 20?

10. A boy shoots 1 arrow 97 rods up the road, and another 65 rods down the road. How many rods apart are the 2 arrows? How many rods will the boy's brother walk to pick up both arrows, and bring them back to him?

11. How many ounces in 3 pounds?

12. Add: \$2.25, \$3.15, \$4.10, \$5.00, \$1.13.

13. What sum added to \$4.50 will make \$9?

14. At 7¢ a quart, what will 1 bu. of chestnuts cost?

15. Find the cost of 38 yd. of cotton, at 7¢ a yard.

16. Find the cost of 42 lb. of dried apples, at 9¢ a pound.

17. A house is 12 yards long by 9 yards wide. How many yards long must a string be to go around the house?

18. How many ninths in $\frac{1}{3}$ in.? In $\frac{2}{3}$ inches?

19. How many twelfths in $\frac{1}{3}$ in.? In $\frac{4}{6}$ inches?

ORAL.

1. What is the sum of \$9, \$7, and \$4.

2. If you pay 10 cents for car-fare, 25 cents for lunch, and 5 cents for fruit, how many cents will you spend?

3. If a slate costs 12 cents, and a reader 26 cents, how much more will one cost than the other?

4. John had 15 cents, and his father gave him 10 more; he then spent 7 cents for candy. How many cents had he left?

Make examples for each of the following:

5.	$14-6+3=?$	6.	$16-9+4=?$
7.	$17-8+6=?$	8.	$13-7+4=?$
9.	$9-6+5=?$	10.	$11-8+6=?$
11.	$8+4-6=?$	12.	$4+7-3=?$
13.	$7+9-8=?$	14.	$8+4-6=?$
15.	$9+8-7=?$	16.	$5+6-9=?$
17.	$11-4-5=?$	18.	$18-6-5=?$
19.	$4+8-7=?$	20.	$6+7-9=?$

21. To 5 add 6, subtract 3, add 7, subtract 8, add 4, subtract 7, add 8, subtract 3; name the remainder.

22. From 15 take 6, add 7, take 5, add 5, take 6, add 4, take 9, add 10; name the sum.

23. To 14 add 5, take 7, add 4, take 3, add 8, take 5, add 6, take 4, add 9, take 6; name result.

24. How many are $13-7+3-4+10-8+5-7+6$?

25. $7+9-10+6-4+7-8+9=?$

26. $2+6-8+4-3+20-10+5=?$

27. $17-8+9-10+7-6-8+9+7-5=?$

28. How much will 8 muffs cost, at \$12 each?

29. If I earn \$12 in a month, and spend \$8, how much can I save in a year?

30. If there are 12 girls in a class, and 2 times as many boys less 9, how many boys are there in the class? How many boys and girls are there?

1. Add: 323, 331, 23, 332, 213, 32, 333.

2. \$21 is ⅓ of how many dollars?

3. What will 6 horses cost, at \$120 each?

4. How many feet in 4 rods?

5. Divide ½ of 72 marbles equally among 6 boys. How many marbles will you give to each boy?

6. A farmer had 230 sheep, and bought 132 more, then sold ⅓ of all he had. How many had he left?

7. What is the average price, if 3 stoves cost \$81?

8. How many boxes will hold 117 lb. of candy, if 3 lb. are put in each box?

9. 5 times 15 cents are how many times 3 cents?

10. What number multiplied by 5 gives 165?

11. A man's salary is \$850 a year, his expenses are \$430 a year. How much does he save in a year?

12. Thomas has 54 marbles, Richard has 48, and Henry has as many as both the others. How many have they all?

13. What 3 equal numbers make 75?

14. What will 9 yd. of cloth cost, at 75¢ a yard?

15. What will 7 lb. of butter cost, at 23¢ a pound?

16. Add: 543, 251, 705, 525, 353, 45, 544.

17. What will 8 stoves cost, at \$35 each?

18. How many pencils at 4¢ each can you buy for 72 cents?

19. I had 2 doz. eggs, sold 16, and broke 4. How many had I left?

20. If 4 knives cost 96 cents, what will 9 cost?

21. What will 8 lb. of tea cost, at 35¢ a pound?

22. How many bushels in 112 pecks?

23. How many gallons in 90 pints?

24. A boy had 28 chickens. A cat killed ⅓ of them, and afterwards the boy bought 15. How many had he then?

25. If 3 bbl. of flour cost \$15, what will 2 bbl. cost?

ORAL.

1. John went fishing, and found that if he had caught 7 more fish he would have caught 30 in all. How many did he catch?

2. 28 and three and nine, less eight, are how many?

3. Five years ago Grace was 15 years old, and Mary is 17 years old to-day. Which is the older? and how many years older?

4. Find the cost of 3 spools of thread at 6¢ a spool?

5. When flour is $5 a barrel, how much must be paid for 5 barrels? 7 barrels?

6. If 5 men can reap a field of grain in 6 days, in how many days can 10 men reap it?

7. A lady bought 8 pounds of sugar at 6 cents a pound, and gave 4 dozen eggs at 10 cents a dozen. How much money does she still owe?

8. Two men start from the same place, and walk in opposite directions, one at the rate of 3 miles an hour, and the other at the rate of 4 miles an hour. How far apart will they be in 8 hours?

9. How far apart would the same men be if they walked in the same direction instead of in opposite directions?

10. At 8 cents a paper, how many papers of pins may be bought for 32 cents?

11. How much will 72 cherries cost, if 9 cherries cost 1 cent?

12. How many weeks are there in 56 days?

13. If a freight train moves at the rate of 12 miles an hour, how many hours will it take it to move 96 miles?

14. 35 are how many times 5? 7?

15. If 9 men can build a barn in 12 days, how long will it take 1 man to build it?

16. If the interest of $1 is 6 cents for a year, what will be the interest of $9 for a year?

1. How many days in the Spring and Summer months?

2. A man bought 8 horses for $76 each. How much did he pay for them?

3. At $70 each, what will 6 wagons cost?

4. At 75 cents a yard, what costs 9 yards of cloth?

5. How many rods of fence will enclose a field 175 rods long and 167 rods wide?

6. A grocer buys butter at 18 cents a pound, and sells it at 25 cents. What does he gain on a pound? On 4 pounds?

7. A boy who had $17, earned $28 more, and then paid $18 for a suit of clothes. How much had he left?

8. How many inches in 2 yards and 2 feet?

9. What cost 7 bushels of potatoes at 75 cents a bushel, and 9 pounds of butter at 17 cents a pound?

10. If you had 60 marbles, and gave ⅓ of them to Harry, and ⅛ of them to George, how many would you have left?

11. How many hours in 9 weeks?

12. I asked Robert how many marbles he had. He replied, "If I had 18 more marbles I should have 45." How many had he?

13. How many eggs in 8 baskets, if there are 6 dozen in each?

14. What cost 8 acres of land at $75 an acre?

15. A boy had 55 cents, which was 17 cents more than his sister had. How many cents had both?

16. Add: $9.76, $8.95, $7.45, $9.17, $7.58, $8.67, $2.83, $8.47, $8.66.

17. Divide: 87 by 7. 99 by 8. 76 by 4. 63 by 3.
49 by 4. 46 by 3. 81 by 6. 94 by 7.
85 by 6. 75 by 5. 64 by 5. 99 by 8.

18. Mr. W. started to walk 56 miles. He walked 24 miles the first day; how many miles were left to walk on the second day?

ORAL.

1. 25 is how much more than 16? 21? 14?

2. Find the cost of ¾ of a yard of 8-cent muslin.

3. In 54 there are how many 9's?

4. How many ounces are there in ¾ of a pound?

5. When butter is 24 cents a pound, what part of a pound can be bought for 6 cents?

6. How much does half a pound of candy cost, if a quarter of a pound costs 5 cents?

7. If ½ a pound of raisins costs 8 cents, what is the price of a pound?

8. Mary buys a doll for 23 cents, and has 8 cents left. How much money did she have at first?

9. If I can buy 2 marbles for a cent, how much must I pay for 12 marbles?

10. Forty-eight quarts are how many gallons?

11. If 2 oranges cost 6 cents, what must I pay for 10 oranges?

12. George has 10 marbles; Willie has 5 more than George. How many marbles have both boys?

13. If 3 peaches cost 9 cents, what will 1 peach cost? How many peaches can you buy for 18 cents?

14. If you have in your bank a quarter, a dime, a half-dime, a 3-cent piece, a 2-cent piece, and a cent, how much money have you?

15. At $5 a ton, what will your father have to pay for 6 tons of coal?

16. How many oranges are there in a box containing 4 dozen?

17. A farmer has 3 horses, 25 cows, and 12 pigs. How many animals does he own?

18. If 9 fire-crackers are sold for a cent, how many can a boy get for a dime?

19. At $9 a dozen, what will 7 doz. caps cost?

SUBTRACTION.

1.	2.	3.	4.	5.	6.
678	879	350	391	734	843
432	864	220	280	600	603
7.	**8.**	**9.**	**10.**	**11.**	**12.**
844	316	999	969	886	213
423	118	286	871	754	176
13.	**14.**	**15.**	**16.**	**17.**	**18.**
583	102	499	605	836	667
474	78	479	403	475	443
19.	**20.**	**21.**	**22.**	**23.**	**24.**
577	543	555	550	734	986
466	469	367	360	466	729
25.	**26.**	**27.**	**28.**	**29.**	**30.**
603	694	310	162	301	952
509	483	109	98	129	863
31.	**32.**	**33.**	**34.**	**35.**	**36.**
740	876	649	790	665	838
685	876	304	600	474	751
37.	**38.**	**39.**	**40.**	**41.**	**42.**
111	799	935	630	936	706
98	654	824	540	845	505
43.	**44.**	**45.**	**46.**	**47.**	**48.**
807	618	428	425	104	286
605	520	365	163	65	107

ORAL.

1. Copy and learn:

12 inches make 1 foot.
3 feet make 1 yard.
5½ yards make 1 rod.
16½ feet make 1 rod.

2. Take the yard-stick, and see how many yards it is round the schoolroom.

3. Take a string 16½ ft. long, and see how many rods it is round the schoolroom.

4. How many yards in 6 feet?

5. How many feet in 24 inches?

6. How many feet in 36 inches?

7. How many inches in 1 yard?

8. How many rods in 11 yards?

9. How many rods in 33 feet?

10. Which is longer, 5½ yards or 16½ feet?

11. Which is longer, 5 yards or 15 feet?

12. If flour is worth $6 a barrel, how many barrels can you buy for $48?

13. How much are 12 tons of coal worth, at $6 a ton?

14. In which month of the year, and on which day of the month, is Independence Day?

15. In which month of the year, and on which day of the month, is Christmas?

16. Find the exact number of days between Memorial Day and the Fourth of July.

17. How many cents are there in a dime? In a half-dime?

18. If an apple costs 2 cents, how many apples can you buy for 16 cents?

19. If there are 9 desks in a row, how many desks are there in 4 rows? In 6 rows?

20. What will 4½ lb. of crackers cost, at 8¢ a pound.

ADDITION.

1.	2.	3.	4.	5.	6.
468	469	658	374	209	287
64	107	73	56	28	39
77	48	77	65	953	43
324	99	166	538	48	119

7.	8.	9.	10.	11.	12.
681	726	299	281	438	74
761	27	919	69	926	638
166	67	402	58	48	38
516	62	89	19	63	639

13.	14.	15.	16.	17.	18.
478	135	95	93	533	76
478	79	50	404	40	5
478	246	94	37	68	432
478	80	163	252	209	671
478	399	87	60	312	36

19.	20.	21.	22.	23.	24.
46	34	271	125	123	23
531	163	408	125	78	67
7	25	5	250	69	198
84	444	63	250	145	474
236	56	150	64	960	545

25.	26.	27.	28.	29.	30.
79	613	75	123	9	47
436	84	63	45	29	9
5	106	148	678	129	428
124	4	99	9	460	476
78	53	460	474	5	74

ORAL.

1. If ½ a pound of candy costs 10 cents, how much must I pay for 2 pounds?

2. I divided 4 apples into fourths. How many pieces did I have?

3. I had two halves of a pear, and cut them into eighths. How many eighths did I have?

4. I cut some apples into thirds, and had 15 pieces. How many whole apples did I have at first?

5. John had 40 cents, Henry 30 cents, and William 20 cents. How many more cents did the boys need to make $1?

6. If ½ a pound of tea costs 40 cents, what does 1 ounce cost? What will be the price of 5 ounces?

7. If candy is 20 cents a pound, what part of a pound can be bought for 5 cents?

8. If ¼ of a pound of candy costs 5 cents, what will 1 pound cost?

9. A farmer had 5 tons of hay, and sold ⅓ of it to one man, and 1½ tons to another. How many tons had he left?

10. A man owned 10 acres of land, and sold 50% of it. How much did he have left?

11. A boy bought 15 marbles, and lost 33⅓% of them. How many did he have left?

12. Which would you rather have, $1 or 100% of $1?

13. Which would you rather have, 25% of $20, or 20% of $25?

14. If your arithmetic is 7 in. wide and 8 in. long, how many square inches are there in one side of its cover?

15. Draw a circle, and mark off 33⅓% of it. Draw another circle of the same size, and mark off ⅓ of it. How do the parts compare?

16. What will 3½ lb. of sugar cost, at 6 cents a pound?

17. Find 33⅓% of $12. $18. $27.

LESSON 50.

MULTIPLICATION.

1.	2.	3.	4.	5.	6.
75	84	93	26	65	79
5	5	5	5	5	5
7.	**8.**	**9.**	**10.**	**11.**	**12.**
88	74	36	86	95	28
6	6	6	6	6	6
13.	**14.**	**15.**	**16.**	**17.**	**18.**
64	58	19	92	76	54
7	7	7	7	7	7
19.	**20.**	**21.**	**22.**	**23.**	**24.**
17	24	31	48	62	89
8	8	8	8	8	8
25.	**26.**	**27.**	**28.**	**29.**	**30.**
82	44	55	66	77	88
9	9	9	9	9	9
31.	**32.**	**33.**	**34.**	**35.**	**36.**
74	68	75	33	56	90
4	4	4	4	4	4
37.	**38.**	**39.**	**40.**	**41.**	**42.**
46	64	32	24	66	58
3	3	3	3	3	3
43.	**44.**	**45**	**46.**	**47.**	**48.**
96	14	45	47	74	54
7	6	5	8	9	4

ORAL.

1. There are 54 seats in a schoolroom, in 6 rows. How many seats in a row?

2. If there are 18 quarts of pickles in 6 jars, how many are there in 9 jars?

3. What is $\frac{1}{2}$ of 36? $\frac{1}{4}$ of 28? $\frac{1}{3}$ of 18? $\frac{1}{5}$ of 40? $\frac{1}{7}$ of 49?

4. How many minutes in $\frac{1}{4}$ of an hour?

5. When 1 comb costs 7 cents, 6 combs will cost —— cents?

6. When 6 spools of silk cost 24 cents, 8 spools will cost —— cents?

7. Add $\frac{1}{2}$ of 18 and $\frac{1}{3}$ of 24.

8. Take $\frac{1}{2}$ of 42 from $\frac{1}{3}$ of 54.

9. How many angles and sides have 6 triangles?

10. How many angles and sides have 4 rectangles?

11. How many angles and sides have 3 pentagons?

12. 4 qt. of oil cost 28 cents. What will 6 qt. cost?

13. When Lucy gets 2 more 5-cent pieces she will have 40 cents. How much money has she now?

14. What 3 coins make 25 cents?

Play you were a storekeeper, and make change for the following:

15. 17 cents from a quarter-dollar.

16. 11 cents from a dime and a nickel.

17. 37 cents from a half-dollar.

18. 15 cents from a quarter-dollar.

19. 18 cents from a half-dollar.

20. 25 cents from a dollar.

21. What numbers between 70 and 80 are divisible by 6?

22. Draw a rectangle 9 in. long and 8 in. wide.

23. Draw another rectangle having the same area, but 12 in. long.

24. How many quarter-dollars are there in $5?

1. Divide by 3:

74 66 48 81 54 92 72 57 69 84 75

2. Divide by 2:

60 41 72 93 54 85 63 76 87 96 78

3. Divide by 4:

24 88 64 73 90 51 72 38 48 86 84

4. Divide by 5:

55 64 73 80 61 75 65 85 95 46 80

5. Divide by 6:

66 84 95 87 45 51 78 98 69 75 85

6. Divide by 8:

96 88 65 95 89 91 72 97 98 64 99

7. Divide by 7:

77 81 96 75 84 90 88 91 99 105 112

8. Divide by 9:

99 94 90 81 108 85 117 126 144 162 171

9. $4)\underline{71}$ $7)\underline{86}$ $8)\underline{93}$ $9)\underline{117}$ $5)\underline{105}$ $6)\underline{72}$

10. $6)\underline{89}$ $3)\underline{74}$ $4)\underline{89}$ $6)\underline{78}$ $8)\underline{92}$ $9)\underline{153}$

11. $7)\underline{126}$ $8)\underline{168}$ $9)\underline{189}$ $6)\underline{144}$ $7)\underline{133}$ $5)\underline{165}$

12. $8)\underline{144}$ $3)\underline{171}$ $6)\underline{186}$ $9)\underline{135}$ $7)\underline{154}$ $2)\underline{184}$

13. $6)\underline{174}$ $7)\underline{161}$ $8)\underline{152}$ $9)\underline{180}$ $5)\underline{185}$ $4)\underline{148}$

14. $5)\underline{155}$ $6)\underline{156}$ $4)\underline{136}$ $7)\underline{175}$ $3)\underline{198}$ $8)\underline{176}$

ORAL.

1. If you give 7 boys $\frac{1}{2}$ of an orange each, how many oranges will it take?

2. 7 halves are how many ones?

3. A man divided some corn among 10 persons, giving each $\frac{1}{3}$ of a bushel. How many bushels did it take?

4. 10 thirds are how many ones?

5. How many pounds of raisins, at 18¢ a pound, can you buy for 27 cents?

6. How much cloth, at \$6 a yard, can you buy for \$21?

7. 23 fifths are how many ones?

8. How many thirds are there in $4\frac{1}{3}$?

9. If $\frac{1}{4}$ of a yard of cloth cost \$3, what will 1 yard cost?

10. 3 is $\frac{1}{2}$ of what number?

11. 4 is $\frac{1}{7}$ of what number?

12. 7 is $\frac{1}{3}$ of what number?

13. 5 is $\frac{1}{3}$ of what number?

14. 4 is $\frac{1}{8}$ of what number?

15. 6 is $\frac{1}{8}$ of what number?

16. 8 is $\frac{1}{3}$ of what number?

17. 9 is $\frac{1}{4}$ of what number?

18. 7 is $\frac{1}{8}$ of what number?

19. 8 is $\frac{1}{7}$ of what number?

20. 9 is $\frac{1}{8}$ of what number?

21. 10 is 5 times what number?

22. If 6 is $\frac{3}{4}$ of a number, what is $\frac{1}{4}$ of it? What is the whole?

23. In $5\frac{3}{7}$ are how many sevenths?

24. A boy having 25 cents, bought 1 quart of cherries for 8 cents, 1 orange for 6 cents, and some candy for 7 cents. How many cents had he left?

25. If 1 qt. of kerosene oil costs 4 cents, how much will 1 gal. cost?

NOTE — Each pupil should be supplied with a quantity of inch cubes.

1. Build a pile 4 in. long, 3 in. wide, and 2 in. high. How many cubes are there in the top layer? How many layers are there?

2. If there are 12 cubes in 1 layer and there are two layers, how many cubes are there in the pile?

3. What name can you give to this pile of blocks? *Ans.* A prism; because a prism is a solid that has length, breadth, and thickness.

4. Multiplying the length and breadth of a prism together, gives what?

5. Multiplying the number of cubes in one layer by the number of layers, gives what?

6. How can you find the number of cubes in a prism?

Using the Rule you have just made, find the cubic inches in the following:

7. A prism 4 in. × 4 in. × 2 in.
8. A prism 4 in. × 3 in. × 2 in.
9. A cube 4 in. × 4 in. × 4 in.
10. A prism 5 in. by 4 in. by 3 in.
11. A prism 5 in. by 5 in. by 2 in.
12. A prism 5 in. by 5 in. by 4 in.
13. A prism 6 in. by 4 in. by 3 in.
14. A prism 6 in. by 5 in. by 4 in.
15. A cube 5 in. by 5 in. by 5 in.
16. A cube 6 in. by 6 in. by 6 in.
17. A prism 8 in. by 6 in. by 4 in.
18. A prism 8 in. by 7 in. by 5 in.
19. A prism 9 in. by 8 in. by 6 in.
20. A cube 8 in. by 8 in. by 8 in.
21. A cube 9 in. by 9 in. by 9 in.
22. A prism 5 in. by 5 in. by 3 in.
23. A prism 6 in. by 6 in. by 5 in.
24. A prism 7 in. by 6 in. by 5 in.

ORAL.

1. How many days in 5 wk. 3 da.? In 6 wk. 5 da.?

2. How many quarts in 6 gal.? In 20 pt.?

3. Mark off a square yard on the board, and divide it into square feet.

4. How many feet in each side of your square? How many square feet in it?

5. How many cubic inches in a prism 4 in. by 3 in. by 2 in.?

6. How many yards in 4 rods?

7. How many dimes in $1.50?

8. How many eagles in $30?

9. What fraction is 25%?

10. What fraction is $33\frac{1}{3}\%$?

11. What fraction is 50%?

12. What fraction is 20%?

13. Make a list of 10 things that have length and breadth. Guess at their length and breadth in feet and inches. Measure to correct your guess.

14. How many pounds in 16 ounces? In 32 ounces?

15. John, James, and Henry bought for 12 cents a pie, which they are to share equally. How much must each pay?

16. Henry started to market with 56 eggs, but broke 25% of them, and sold 50% of the remainder. How many did he sell?

17. There are 84 acres in a certain lot. How many acres would you buy if you bought $33\frac{1}{3}\%$ of the lot?

18. If 1 cord of wood cost $5, what will 20% of a cord cost?

19. John had 5 cents and 6 cents. He spent 8 cents and earned 4 cents. How many cents had he then?

20. What is the cost of a pint of maple syrup if a quart costs 22 cents?

1. I bought 2½ pounds of meat at 14¢ a pound, and 4 doz. eggs at 15¢ a dozen. How much did they cost?

2. If 2 qt. of milk weigh 1½ lb., what does 1 gal. weigh?

3. How many pounds of sugar, at 6¢ a pound, will pay for 8 qt. of berries at 7¢ a quart?

4. 3 qt. 1 pt. are how many pints?

5. 5 gal. 3 qt. are how many quarts?

6. 3 pk. 3 qt. are how many quarts?

7. 5 bu. 3 pk. are how many pecks?

8. 7 yd. 1 ft. are how many feet?

9. 5 ft. 9 in. are how many inches?

10. 5 doz. 7 things are how many things?

11. 4 lb. 6 oz. are how many ounces?

12. Find the following parts of numbers; illustrate each, if necessary, with objects:

¼ of 28.	⅛ of 36.	⅓ of 24.	⅓ of 20.
⅜ of 16.	⅜ of 24.	⅚ of 12.	⅐ of 21.
¾ of 24.	⅚ of 18.	⅔ of 18.	⅕ of 25.

13. If a family eat 6 oranges every day, how long will 4 doz. last them?

14. Write the names of the months of the year that have 31 days.

15. What will a gallon and a pint of milk cost at 6¢ a quart?

16. How many yards round a room 20 ft. square?

17. If 3 lb. of chops cost 84 cents, what will 1 pound cost?

18. If 6 lb. of sausages cost 96 cents, what will 1 pound cost?

19. If 5 lb. of lamb cost 90 cents, what will 1 pound cost?

20. Add: $5.20, $6.00, $2.41, $0.53.

ORAL.

1. How much is hay a ton if $88 is paid for 8 tons?

2. ½ of $64 is what a man paid for 2 puppies. How much did he pay for one?

3. If board is $3 a week, how much is it for 28 days?

4. If 1 bu. of chestnuts is worth $7, how much are 9 bu. worth?

5. Fred earns 6 cents an hour. How much will he earn in 8 hours?

6. One man had $63, another ⅓ as much. How much had the second man?

7. One bag of barley weighs 84 pounds. How much will ⅛ of a bag weigh?

8. At $7 a yard what will 5 yards of cloth cost? 8 yards?

9. Out of a class of 25 pupils, 5 failed. What part of the class failed? What % of the class failed?

10. Jennie is 15 years old. How old was she 6 years ago? How old will she be in 6 years?

11. I bought a pair of shoes for $3.25, and a hat for $3. How much money did I spend?

12. If a wild rose has five petals, how many petals have five wild roses?

13. One dime is what part of 50 cents.

14. A bug has 6 legs. How many legs have 6 bugs?

15. A store-keeper has 48 skates. How many pairs of skates has he?

16. Name the odd numbers from 1 to 20?

17. Name the even numbers from 20 to 40.

18. If I have 36 pears, to how many children can I give 4 pears each?

19. 64 is the product of what two equal numbers?

20. Repeat the table for Dry Measure.

21. Repeat the table for Liquid Measure.

1. Divide by 3:

99 123 210 186 279 240 330 432 219 162

2. Divide by 4:

364 88 320 168 256 164 422 564 612 768

3. Divide by 5:

175 95 215 370 325 400 365 435 625 495

4. Divide by 6:

600 126 204 300 486 186 372 642 534 324

5. Divide by 7:

700 637 560 854 77 784 427 511 357 378

6. Divide by 8:

800 648 744 896 400 816 464 568 376 296

7. Divide by 9:

648 450 540 837 999 918 729 639 567 486

8. Divide by 2:

460 264 374 444 212 678 476 564 712 842

9. Divide by 8:

472 544 312 520 696 888 552 632 440 376

10. Divide by 9:

218 414 738 639 549 693 756 567 657 855

11. Divide by 7:

294 245 588 441 672 406 546 657 749 462

12. Divide by 6:

192 456 378 984 714 510 426 546 612 342

13. Divide by 8:

536 624 736 456 864 912 559 632 432 352

14. Divide by 9:

621 747 846 963 585 495 676 765 873 927

15. Divide by 5:

985 865 745 625 535 885 465 545 630 715

ORAL.

1. Find the cost of 6 histories, at 7 dimes each.
2. How many coats, at $9 each, can you buy for $54?
3. Find the cost of 1 cow, if 6 cows cost $72.
4. Find the cost of 6 cloaks, at $8 each.
5. Find the cost of 1 acre, when 7 cost $56.
6. How many acres, at $7 an acre, can you buy for $63?
7. Find the cost of 9 oranges, at 3 cents each.
8. How many yards of ribbon, at 8¢ a yard, can you buy for 64 cents?
9. What will 1 table cost, if 9 tables cost $99?
10. How many cords of wood can you get for $81, at $9 a cord?
11. What will ten bbl. of apples cost, at $3 a barrel?
12. What is the cost of 9 pairs of boots, at $6 a pair?
13. If 1 load of corn cost $7, how much will 10 loads cost?
14. ½ of 24 plus ⅓ of 24 plus ¼ of 24, are how many?
15. ⅛ of 24 plus ⅐ of 28 plus ⅛ of 32, are how many?
16. ½ of 12 is ⅙ of what number?
17. ⅓ of 12 is ¼ of what number?
18. What is the cost of 9 trunks, if 7 trunks cost $35?
19. What is the cost of 8 bureaus, when 6 bureaus cost $36?
20. If in each of 12 classes there are 12 pupils, how many pupils are there in all the classes?
21. Find the cost of 9 sets of silver spoons at $5 a set.
22. How many oranges, at 3¢ each, can you buy for 36 cents?
23. Give the abbreviations of the words used in the table for Dry Measure.
24. Give the abbreviations of the words used in the table for Liquid Measure.

1. Name two objects in the room 1 rod apart.

2. If it is 4 rods from my barn to my house, how many feet long is a wire that reaches from one to the other? What will the wire cost, at 3¢ a foot?

3. A door is 2 yd. 10 in. long. How many inches long is it?

4. If there are 84 yd. in a roll of carpeting, how many feet are there?

5. If the maple tree in our yard is 75 feet high, and the elm tree 56 feet high, what is the difference in height?

6. Measure, and find the number of square feet in one of the walls of the schoolroom.

7. How many square inches in 1 square foot?

8. Find the number of square inches in the top of your desk.

9. What is the cost of a rectangular marble slab, 3 ft. by 2 ft., at $3 a square foot?

10. Find the area of all the faces of a brick.

11. Find the cubic contents of a brick.

12. Find the area of the faces of a crayon-box.

13. Find the number of cubic inches of crayon that could be put in the box.

14. I have a rectangular flower-garden 36 ft. long, and ½ as wide. How many square feet does it contain?

15. How many feet of moulding will be required for a room 20 ft. by 14 ft.?

16. Find the area of the floor of the schoolroom.

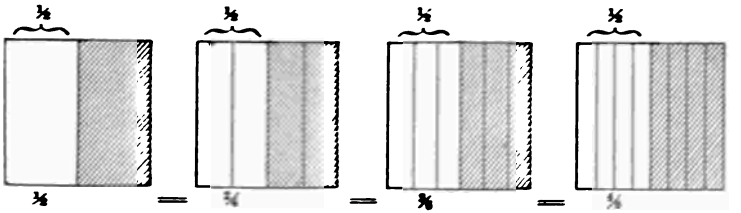
17. Find the area of each wall in the schoolroom.

18. Find the entire area of one of your rooms at home.

19. At 16¢ a foot, what is the cost of a drain pipe 27 rd. long?

20. A man started to walk a mile. After walking 266 rd., he stopped. How much less than a mile did he walk?

To show that the same fraction (part of a unit) may have different names; or to show how to find a common name (denominator) for different fractions.



	4ths	6ths	8ths	9ths	10ths	12ths	14ths	15ths	16ths	18ths	20ths	21sts	22nds	24ths
1/2	2/4	3/6	4/8		5/10	6/12	7/14		8/16	9/18	10/20		11/22	12/24
1/3		2/6		3/9		4/12		5/15		6/18		7/21		8/24
1/4	1/4		2/8			3/12			4/16		5/20			6/24
1/5					2/10			3/15			4/20			
1/6		1/6				2/12				3/18				4/24
1/7							2/14					3/21		
1/8			1/8						2/16					3/24
1/9				1/9						2/18				
1/10					1/10						2/20			
1/11													2/22	
1/12						1/12								2/24

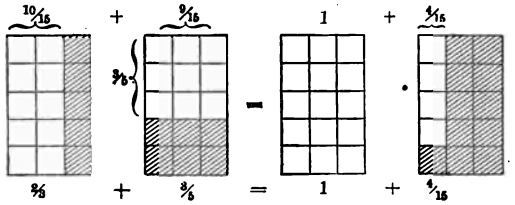
NOTE. — Do not require the pupils to memorize this table. Teach them how to use it in order to find a common name. Many pupils will probably quickly learn the more common equivalents by referring to the table for a few lessons.

1. From the table find what fractions are equal to 1/3, and then illustrate as at the top of the page.

2. Do the same with 1/4, 1/5, 1/6.

3. From the table, find what fractions are equal to 8/16, 3/12, 5/15, 2/8, 6/18, 3/9, 5/10, 7/14, 3/15, 9/18, 5/20, 4/16, 6/16, 4/12, 2/8, 3/18, 3/21, 4/20, 11/22.

To add fractions not having a common denominator.



Illustrate the following as above:

1.	2.	3.	4.
$\frac{2}{3} + \frac{1}{2} = ?$	$\frac{1}{2} + \frac{3}{5} = ?$	$\frac{2}{4} + \frac{3}{5} = ?$	$\frac{2}{3} + \frac{3}{6} = ?$
$\frac{1}{2} + \frac{3}{4} = ?$	$\frac{2}{3} + \frac{4}{5} = ?$	$\frac{3}{4} + \frac{3}{5} = ?$	$\frac{2}{3} + \frac{4}{6} = ?$
$\frac{2}{3} + \frac{3}{4} = ?$	$\frac{1}{2} + \frac{4}{5} = ?$	$\frac{2}{4} + \frac{4}{5} = ?$	$\frac{3}{4} + \frac{4}{6} = ?$

5.	6.	7.	8.
$\frac{2}{3} + \frac{2}{6} = ?$	$\frac{2}{3} + \frac{5}{6} = ?$	$\frac{1}{2} + \frac{7}{8} = ?$	$\frac{1}{2} + \frac{5}{6} = ?$
$\frac{3}{5} + \frac{3}{10} = ?$	$\frac{2}{5} + \frac{7}{10} = ?$	$\frac{1}{2} + \frac{3}{6} = ?$	$\frac{2}{3} + \frac{4}{9} = ?$
$\frac{7}{12} + \frac{4}{6} = ?$	$\frac{2}{3} + \frac{3}{6} = ?$	$\frac{2}{4} + \frac{4}{8} = ?$	$\frac{3}{6} + \frac{7}{12} = ?$
$\frac{1}{2} + \frac{4}{8} = ?$	$\frac{2}{3} + \frac{6}{9} = ?$	$\frac{5}{6} + \frac{6}{12} = ?$	$\frac{1}{3} + \frac{2}{6} = ?$

9.	10.	11.	12.
$\frac{2}{3} + \frac{3}{4} = ?$	$\frac{1}{3} + \frac{5}{12} = ?$	$\frac{7}{8} + \frac{3}{4} = ?$	$\frac{1}{3} + \frac{8}{9} = ?$
$\frac{1}{2} + \frac{5}{8} = ?$	$\frac{4}{5} + \frac{9}{10} = ?$	$\frac{1}{4} + \frac{5}{8} = ?$	$\frac{5}{6} + \frac{7}{12} = ?$
$\frac{2}{3} + \frac{2}{5} = ?$	$\frac{3}{4} + \frac{10}{12} = ?$	$\frac{1}{2} + \frac{3}{8} = ?$	$\frac{1}{4} + \frac{3}{12} = ?$
$\frac{2}{3} + \frac{7}{9} = ?$	$\frac{1}{2} + \frac{4}{10} = ?$	$\frac{2}{3} + \frac{2}{6} = ?$	$\frac{3}{4} + \frac{5}{12} = ?$

13.	14.	15.	16.
$\frac{2}{3} + \frac{4}{6} = ?$	$\frac{1}{2} + \frac{3}{10} = ?$	$\frac{2}{4} + \frac{9}{12} = ?$	$\frac{1}{4} + \frac{1}{5} = ?$
$\frac{1}{3} + \frac{5}{6} = ?$	$\frac{2}{5} + \frac{3}{10} = ?$	$\frac{5}{6} + \frac{7}{12} = ?$	$\frac{2}{4} + \frac{2}{5} = ?$
$\frac{4}{5} + \frac{7}{10} = ?$	$\frac{1}{3} + \frac{3}{5} = ?$	$\frac{2}{6} + \frac{9}{12} = ?$	$\frac{1}{4} + \frac{3}{5} = ?$
$\frac{3}{5} + \frac{9}{10} = ?$	$\frac{2}{3} + \frac{2}{5} = ?$	$\frac{4}{6} + \frac{5}{12} = ?$	$\frac{3}{4} + \frac{4}{5} = ?$

ORAL.

1. If 4 tons of hay cost $40, what will 3 tons cost?

2. When 7 qt. of huckleberries cost 35 cents, how many cents will 5 qt. cost?

3. If 28 cents will buy 4 qt. of berries, how many quarts will 35 cents buy?

4. When $48 are paid for 8 bbl. of flour, how many barrels can be bought for $72?

5. If 4 cents will buy 8 apples, how much will 24 apples cost?

6. If 6 cents will buy 5 apples, how many apples will 18 cents buy?

7. At 6 cents a quart, how many quarts of cherries can be bought for 96 cents?

8. 6 times 6 are how many times 3?

9. 4 times 9 are how many times 3?

10. I bought 3 buffalo robes at $12 each, and gave 6 cords of wood in payment. How much was the wood worth a cord?

11. A man bought some butter for $9, some syrup for $6, and some flour for $7. How much did he give for them all?

12. Charles had 50 cents in the morning, but during the day he bought a pencil for 10 cents, and a rubber for 5 cents. How many cents had he at night?

13. Mary is 15 years old, and Jane is 9 years old. How many years will it be before Jane is 15 years old?

14. A boy had 10 marbles, and bought 15 more. He then lost 12; how many had he left?

15. A man bought a horse for $60, a harness for $20, and a wagon for $30. He sold them all for $100; how many dollars did he lose?

16. A man earned $16 in 4 days; how much did he earn in 1 day?

1. How many inches in 9 feet?

2. How many feet in 25 yards?

3. How many yards in 8 rods?

4. How many inches in ½ yard?

5. How many feet in 2 rd. 3 yd. 2 ft.?

6. How many ounces in 9 pounds?

7. What will 1 gallon of cream cost, at 21 cents for 7 gills?

8. If 8 pints of nuts cost 24 cents, what will 3 pecks cost?

9. How many cupfuls of milk in 2 quarts, if each cup holds 2 gills?

10. How many oranges, at the rate of 2 for 5 cents, can I buy for 20 cents?

11. Find the cost of 20 lb. and 4 oz. of sugar, at 8¢ a pound?

12. A man bought a watch for $64, but only paid for 25% of it. How much did he pay?

13. A man bought a horse for $240, and sold it so as to gain 25%. How much did he gain?

14. What cost 36 quarts of milk, at 35 cents for 7 qt.?

15. If 4 books cost 48 cents, how many can I buy for 72 cents?

16. A boy earned 80 cents a day, and spent 50 cents a day. How much did he save in a week?

17. If 37 men can do a piece of work in 8 days, how many days will it take 1 man to do the same work?

18. If I buy 12 barrels of flour at $6 a barrel, and sell it all for $98, how much shall I make?

19. A grocer paid $97 for sugar and $45 for molasses. How much more did he pay for sugar than molasses? How much did they both cost?

20. How much will 8 months' wages amount to, at $27 a month?

ORAL.

1. What is the cost of 7 melons, at 9¢ each?
2. At 12¢ each, what will 9 melons cost?
3. Paid \$9 for a lamp and \$2 for a shade. What will 6 lamps and 6 shades cost?
4. At 10¢ a ride, how many rides can a person have for 80 cents?
5. How many sheep, at \$9 each, should a man give in exchange for 9 calves, at \$8 each?
6. How many units in $\frac{1}{2}$? $\frac{1}{4}$? $\frac{1}{8}$?
7. How many units in $\frac{1}{7}$? $\frac{1}{6}$? $\frac{1}{4}$?
8. $\frac{1}{3}$ of 18 is how many times 2?
9. $\frac{1}{5}$ of 20 is how many times 4?
10. If a boat is 3 hours in performing $\frac{1}{3}$ of its trip, how many hours, at the same rate, will its whole trip take?
11. $2 + 8 - 3$ is $\frac{1}{4}$ of what number?
12. $\frac{1}{3}$ of 21 is $\frac{1}{8}$ of what number?
13. 9 is $\frac{1}{8}$ of what number?
14. $7 + 8 - 5 - 4$ is $\frac{1}{3}$ of what number?
15. 4 is $\frac{2}{3}$ of what number?
16. 12 is $\frac{3}{7}$ of what number?
17. 36 is $\frac{6}{11}$ of what number?
18. How many are 9×5 and $\frac{1}{3}$ of 5?
19. What is the sum of $\frac{1}{3}$ and $\frac{2}{3}$? $\frac{2}{3}$ and $\frac{1}{3}$?
20. How much are $\frac{3}{4}$ and $\frac{2}{4}$?
21. Put in the proper signs:

15	6 = 9.	4	3 = 12.	4	3 = 12.
4	6 = 10.	27	3 = 9.	18	3 = 6.
8	7 = 15.	64	8 = 8.	25	5 = 5.
15	9 = 6.	2	10 = 12.	16	7 = 9.

22. 21 peaches were equally divided among 5 persons. How many peaches did each one have?
23. If 5 men can build a wall in 6 days, how many men can do it in 1 day?

1. How many quarts of beans can be put in a half-bushel and a peck measure?

2. A barrel of flour weighs 196 pounds. What is the weight of ¼ a barrel?

3. A milkman sells 63 quarts of milk daily. How many does he sell in 1 week? In 4 weeks?

4. A rectangular box which measures 11 in. long, 3 in. wide, and 6 in. deep, contains how many cubic inches?

5. How much will 26 gal. 3 qt. of milk cost, at 2¢ a pint?

6. How much must you pay for 2 doz. apples, at the rate of three apples for 5 cents?

7. How much money will you need to pay for a dozen oranges at 3¢ each, and 1 doz. lemons at the rate of 3 for 6 cents?

8. A pile of wood 8 ft. long, 4 ft. wide, and 4 ft. high, is a cord. How many cubic feet does it contain?

9. How many cubic feet are there in a pile of wood 9 ft. long, 7 ft. wide, and 5 ft. high?

10. Does this pile of wood contain more than a cord?

11. A room is 15 ft. long and 12 ft. wide. What is the area of the floor in square yards?

12. A room is 8 yd. long and 5 yd. wide and 3 yd. high. How many square yards are there in the floor? In the ceiling? In one side? In both sides? In one end? In both ends? In the whole room?

13. If 9 horses cost $729, what is their average price?

14. If you buy 3 doz. pencils at 20¢ a dozen, and sell them at 3¢ each, how much do you gain?

15. What is the cost of 2½ bu. of wheat, at 80 cents a bushel?

16. One half of a number is 64. What is the number?

17. At 6¢ a yard, what is the cost of 5 yards of tape?

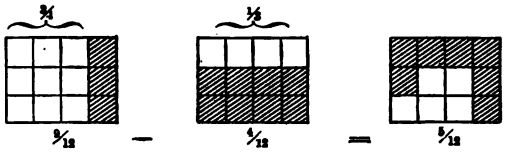
18. What is the cost of 9 tons of coal, at $6 a ton?

ORAL.

1. How much longer is 19 ft. than a rod?
2. 19 is how much more than a dozen?
3. How many school days in 5 weeks?
4. How many gallons in 24 quarts? In 24 pints?
5. 20 ft. equals —— yd. —— ft.
6. 24 oz. equals —— lb. —— oz.
7. 14 mo. equals —— yr. —— mo.
8. 18 qt. equals —— gal. —— qt.
9. If you had ½ lb. of candy, and should give 3 oz. to your sister and 5 oz. to your brother, how much would you have left?
10. Name all the numbers that will divide 12 evenly.
11. Draw a rectangle containing 24 square inches. How long and how wide have you made it?
12. What different length and width might it have?
13. Give a third length and breadth that it might have.
14. What part of a day is 12 hours? 8 hours? 6 hours? 24 hours?
15. How many hours from 1 A.M. to 5 P.M.?
16. What does A.M. stand for?
17. How many half-dimes in 30 cents?
18. 1 lb. of coffee costs 32 cents, what will 4 oz. cost?
19. What is the cost of 15 ft. of tape at 3¢ a yard?
20. How many yards in a rod?
21. Which is longer, 16½ ft. or 5½ yd.?
22. Bessie bought 18 oranges at ½¢ each. How much did she give for them?
23. How many more days in January than February?
24. What 5 pieces of money make $1½?
25. What 6 pieces of money make $.50.
26. Nine times 4 are how many times 6?
27. A boy had $18, he earned $13 more, and his father gave him $3. How many dollars had he then?

LESSON 68.

TO ILLUSTRATE SUBTRACTION OF FRACTIONS.



Illustrate:

1.	2.	3.	4.
$\frac{2}{3} - \frac{1}{2} = ?$	$\frac{3}{4} - \frac{2}{3} = ?$	$\frac{7}{8} - \frac{2}{6} = ?$	$\frac{3}{5} - \frac{3}{10} = ?$
$\frac{1}{2} - \frac{1}{4} = ?$	$\frac{6}{8} - \frac{2}{3} = ?$	$\frac{5}{6} - \frac{2}{3} = ?$	$\frac{4}{6} - \frac{7}{12} = ?$
$\frac{3}{4} - \frac{1}{2} = ?$	$\frac{4}{5} - \frac{1}{2} = ?$	$\frac{5}{6} - \frac{3}{4} = ?$	$\frac{7}{10} - \frac{2}{5} = ?$

5.	6.	7.	8.
$\frac{5}{6} - \frac{2}{4} = ?$	$\frac{7}{5} - \frac{2}{4} = ?$	$\frac{6}{9} - \frac{2}{3} = ?$	$\frac{2}{3} - \frac{2}{6} = ?$
$\frac{4}{5} - \frac{2}{3} = ?$	$\frac{5}{12} - \frac{1}{4} = ?$	$\frac{5}{9} - \frac{1}{3} = ?$	$\frac{2}{3} - \frac{6}{9} = ?$
$\frac{7}{8} - \frac{5}{6} = ?$	$\frac{4}{12} - \frac{1}{3} = ?$	$\frac{4}{8} - \frac{2}{6} = ?$	$\frac{7}{8} - \frac{1}{2} = ?$

9.	10.	11.	12.
$\frac{5}{8} - \frac{1}{2} = ?$	$\frac{4}{6} - \frac{2}{3} = ?$	$\frac{12}{15} - \frac{2}{3} = ?$	$\frac{4}{8} - \frac{2}{4} = ?$
$\frac{7}{8} - \frac{3}{4} = ?$	$\frac{3}{6} - \frac{1}{4} = ?$	$\frac{4}{5} - \frac{3}{4} = ?$	$\frac{5}{6} - \frac{6}{12} = ?$
$\frac{6}{8} - \frac{2}{4} = ?$	$\frac{8}{12} - \frac{3}{6} = ?$	$\frac{6}{10} - \frac{1}{2} = ?$	$\frac{2}{3} - \frac{4}{9} = ?$

13.	14.	15.	16.
$\frac{2}{3} - \frac{1}{4} = ?$	$\frac{3}{4} - \frac{5}{8} = ?$	$\frac{3}{5} - \frac{1}{2} = ?$	$\frac{2}{3} - \frac{3}{6} = ?$
$\frac{3}{4} - \frac{1}{3} = ?$	$\frac{1}{4} - \frac{1}{8} = ?$	$\frac{3}{4} - \frac{3}{5} = ?$	$\frac{3}{4} - \frac{4}{6} = ?$
$\frac{5}{6} - \frac{1}{2} = ?$	$\frac{1}{3} - \frac{1}{4} = ?$	$\frac{4}{5} - \frac{2}{4} = ?$	$\frac{2}{3} - \frac{2}{6} = ?$

17.	18.	19.	20.
$\frac{7}{12} - \frac{3}{6} = ?$	$\frac{7}{9} - \frac{2}{3} = ?$	$\frac{9}{10} - \frac{4}{5} = ?$	$\frac{1}{2} - \frac{3}{8} = ?$
$\frac{1}{3} - \frac{2}{6} = ?$	$\frac{5}{9} - \frac{4}{6} = ?$	$\frac{10}{12} - \frac{3}{4} = ?$	$\frac{8}{9} - \frac{2}{3} = ?$
$\frac{2}{3} - \frac{2}{5} = ?$	$\frac{5}{12} - \frac{1}{3} = ?$	$\frac{4}{10} - \frac{1}{2} = ?$	$\frac{5}{6} - \frac{7}{12} = ?$

ORAL.

1. What part of a month is a week?
2. What part of a week is a day?
3. What part of a day is an hour?
4. What part of an hour is a minute?
5. What part of an hour is 30 minutes? What per cent of it?
6. What part of an hour is 20 minutes? What per cent of it?
7. What part of an hour is 15 minutes? What per cent of it?
8. What part of an hour is 10 minutes? What per cent of it?
9. What part of a year is a month?
10. What part of a year is 3 months? What per cent is it?
11. What part of a year is 4 months? What per cent is it?
12. What part of a year is 6 months? What per cent is it?
13. How many seconds in $\frac{1}{2}$ a minute? In 50% of a minute?
14. How many seconds in $\frac{1}{4}$ of a minute? In 25% of a minute?
15. How many seconds in $\frac{1}{3}$ of a minute? In $33\frac{1}{3}$% of a minute?
16. How many hours in $\frac{1}{2}$ of a day?
17. How many hours in $\frac{1}{3}$ of a day?
18. How many hours in $\frac{1}{4}$ of a day?
19. How many hours in 2 days? 10 days?
20. How many days in 24 hours? 48 hours?
21. How many days in 5 weeks? $4\frac{3}{7}$ weeks?
22. How many weeks in 49 days? 56 days?
23. How many months in $2\frac{1}{2}$ years? $3\frac{1}{4}$ years?

1. Find the cost of 15 cords of wood at $7 a cord?

2. A room is 18 ft. wide and 20 ft. long. How many square feet in the floor? How many in the ceiling? How many feet of picture-moulding will go round the room?

3. How many square yards in a crumb-cloth 3 yd. × 3 yd.? What is it worth, at 75¢ a square yard?

4. How much are 3 cows worth, at $24 each, and 9 horses, at $80 each?

5. Find the cost of 6 tons of coal at $5 a ton, and 35 cords of wood at $5 a cord?

6. Find the cost of 7 hogs at $9 each, and 15 sheep at $6 each.

7. Find 20% of $500.

8. Find 10% of $100.

9. Find the number of quarts in 35 gal. 3 qt.

10. Find the number of pecks in 85 bu. 82 pk.

11. How many feet in 8 rd. 7 ft.?

12. If there are 128 cu. ft. in a cord, how much more than a cord is there in a pile of wood 10 ft. × 5 ft. × 4 ft.?

13. A sign-board is 9 ft. long and 6 ft. wide. How much will it cost to paint it, at 5¢ a square foot?

14. In a flower-garden there are 7 rectangular beds. If each bed is 9 ft. × 5 ft., how many square feet are there in all the beds?

15. ½ a pound of prunes is worth 12 cents. What is the cost of ¼ of a pound? Of ⅓ of a pound?

16. If ¼ of an acre is worth $40, what is ⅓ of an acre worth?

17. My barn cost $500. I owe for 20% of it. How much do I owe?

18. Find the area of the sidewalk in front of the schoolhouse.

19. Add: $\frac{1}{10}$ and $\frac{3}{5}$ $\quad \frac{3}{5}$ and $\frac{7}{5}$ $\quad \frac{3}{4}$ and $\frac{7}{12}$ $\quad \frac{1}{2}$ and $\frac{1}{8}$

$\frac{1}{2}$ and $\frac{3}{8}$ $\quad \frac{2}{5}$ and $\frac{4}{15}$ $\quad \frac{1}{3}$ and $\frac{5}{12}$ $\quad \frac{3}{8}$ and $\frac{3}{4}$

ORAL.

Copy and learn:

24 sheets of paper make 1 quire.
20 quires of paper make 1 ream.
20 single things make 1 score.

1. A score is how many more than a dozen?

2. How many sheets of paper in half a quire?

3. A quire is usually divided into 4 equal parts. How many sheets are there in each part?

4. From a jug holding 2 gallons of water 3 quarts were emptied. How many quarts remained?

5. What will be the cost of 15 lb. of sugar, at 5¢ a pound?

6. How many peaches, at 4¢ each, can you buy for 27 cents, and how many cents will you have left?

7. If ½ a yard of cloth is worth $2, what are 3 yards worth?

8. If half a dozen eggs cost 8 cents, what will 3 doz. cost?

9. What will 2 bu. cost, if a peck costs 25 cents?

10. How many bags, each holding 2 bu., are needed to hold 24 bushels?

11. The distance round a square is 4 times 9 inches. How many inches on one side of the square?

12. How many sheets of paper are there in a quarter of a quire?

13. If you know the price of 9 oranges, how can you find the price of 1 orange?

14. How can you find the price of 8 oranges, if you know the price of one?

15. John is 9 years old, and his father is 3 times as old and 9 years more. How old is his father?

16. Ella bought 7 yards of cloth at 9¢ a yard, and had 8 cents left. How much money had she at first?

Add:

1.	2.	3.	4.	5.	6.	7.
546	607	741	641	821	738	436
723	796	835	257	632	837	436
205	438	367	648	748	692	436
434	362	346	536	596	973	436

Subtract:

8.	9.	10.	11.	12.	13.	14.
769	835	257	632	436	963	641
607	697	163	496	295	778	392

Multiply:

15.	16.	17.	18.	19.	20.	21.	22.
78	97	67	89	68	48	84	94
6	5	8	4	9	7	8	9

Divide:

23.	24.	25.	26.	27.	28.
$4\overline{)368}$	$5\overline{)560}$	$6\overline{)228}$	$8\overline{)432}$	$9\overline{)468}$	$7\overline{)287}$

Multiply:

29.	30.	31.	32.	33.	34.	35.
32	76	21	78	96	40	65
3	4	5	6	7	8	9

Divide:

36.	37.	38.	39.	40.	41.
$8\overline{)512}$	$9\overline{)729}$	$8\overline{)248}$	$6\overline{)648}$	$7\overline{)343}$	$5\overline{)575}$

Add:

42.	43.	44.	45.	46.	47.
$\frac{2}{3}+\frac{5}{6}$	$\frac{5}{6}+\frac{3}{4}$	$\frac{4}{5}+\frac{1}{2}$	$\frac{2}{3}+\frac{3}{4}$	$\frac{1}{3}+\frac{1}{2}$	$\frac{3}{5}+\frac{3}{4}$

Subtract:

48.	49.	50.	51.	52.	53.
$\frac{5}{6}-\frac{1}{2}$	$\frac{2}{3}-\frac{1}{2}$	$\frac{3}{4}-\frac{1}{3}$	$\frac{5}{6}-\frac{2}{3}$	$\frac{7}{8}-\frac{3}{4}$	$\frac{7}{8}-\frac{2}{3}$

ORAL.

1. A box is 4 in. long, 3 in. wide, and 2 in. deep. If it is filled with nails, how many cubic inches of nails does it hold?

2. How many square inches are there in the top of this box? What other face of the box has the same number of square inches?

3. How many square inches in one end of this box? How many square inches in the other end?

4. How many square inches in one side of this box? How many square inches in the other side?

5. Take a cube and put your finger on the front upper right-hand corner of it. In how many different directions can you move your finger and yet follow along an edge of the cube?

6. Because any solid, like a box or cube, extends from one point in 3 directions, we say it has 3 dimensions.

7. How many dimensions has a box or room?

8. How do you find the number of square feet in the floor of a room?

9. What two dimensions of a room are multiplied together to find the number of square feet in the ceiling?

10. How do you find the square feet in one side of a room?

11. How do you find the number of square feet in one end of a room?

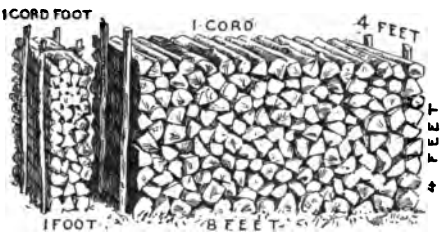
12. Why do you not use the height of a room in finding the area of the floor?

13. Make a pile of blocks that shall contain 24 cubic inches. How long, wide, and high is the pile? What are the dimensions of the pile?

14. Make an example to illustrate cubic contents.

15. How many cubic inches in a box 4 in. by 3 in. by 3 in.?

16. How many cubic inches in a box 5 in. by 5 in. by 2 in.?



Wood is generally prepared for the market by cutting the sticks each 4 ft. in length. These are laid in piles, so that the length of the stick is the width of the pile. In the picture, the larger pile represents a cord. See how long, wide, and high it is. How many cubic feet are there in it? The smaller pile represents a cord foot. See how long, wide, and high it is. What part of a cord is it?

cd. stands for cord or cords.

cd. ft. stands for cord feet.

1. Find the number of cubic feet in a pile of wood 8 ft. long, 4 ft. wide, and 4 ft. high. How many more cubic feet does this pile need to make a cord?

2. Find the number of cubic feet in a pile of wood 4 ft. long, 4 ft. wide, and 4 ft. high. Is this a cord? What part of a cord is it?

3. Find the number of cubic feet in a pile of wood 16 ft. long, 4 ft. wide, and 4 ft. high.

4. Find the cubic feet in a pile of wood 10 ft. long, 8 ft. wide, and 6 ft. high.

5. A pile of wood is 1 ft. long, 4 ft. wide, and 4 ft. high. How many cord feet are in the pile? What part of a cord is it?

6. A pile of wood is 8 ft. long, 4 ft. wide, and 8 ft. high. How does its length compare with the length of a cord of wood? How do the widths compare? The heights? How many cords are there in the pile?

7. A pile of wood is 8 ft. long, 8 ft. wide, and 4 ft. high. How many cords are there in it?

8. Make an example about a pile of wood.

ORAL.

1. Find 50% of $40. 33⅓% of 36 oranges. 25% of 88 rabbits.

2. If you have 20 problems in your arithmetic lesson, and miss 25% of them, how many will you solve?

3. If you have 20 problems in your arithmetic lesson, and solve 20% of them, how many will you miss?

4. Alice had 21 plums, and gave ⅓ of them to her brother Edward. How many plums did she give to her brother?

5. Alice had 21 plums, and gave 33⅓% of them to her brother Edward. How many plums did she give to her brother?

6. Jack had 20 oranges, and sold 50% of them. How many did he sell?

7. Jack had 20 oranges, and sold ½ of them. How many did he sell?

8. A boy has 24 cents, and his brother has ¼ as many. How many cents has his brother?

9. A boy has 24 cents, and his brother has 25% as many. How many cents has his brother?

10. Mary had 12 oranges, and gave her brother ¾ of them. How many did she give her brother?

11. Mary has 25 pears, and her sister has ⅕ as many. How many has her sister?

12. Mary has 25 pears, and her sister has 20% as many. How many has her sister?

13. Arthur bought 24 pens, and sold ⅜ of them. How many did he sell?

14. If a man pays $30 for 6 sheep, how much at the same rate does he pay for 5 sheep?

15. If Mary paid $3 for 12 yards of cloth, how many yards did she buy for $1? How many did she buy for $12?

1. How much must you pay for 18 barrels of apples at $3 a barrel?

2. What is the cost of 245 chairs at $2 each?

3. What is the cost of 7 sofas if one sofa costs $35?

4. At $5 a cord, what must I pay for 89 cords of wood?

5. If I pay $39 a month to each of 9 men, how much money do I pay out each month?

6. How many barrels of flour at $6 a barrel can you buy for $936?

7. If Harry can earn $8 in one week, in how many weeks can he earn $480?

8. If 3 yards of cloth make a coat, how many coats can be made from 279 yards?

9. At $7 a barrel, how many barrels can be bought for $413?

10. If 9 cows cost $486, what is the price of one cow?

11. I received $119 for 7 tons of hay. How much was that a ton?

12. How many melons at 9¢ each can you buy for 315 cents?

13. At $4 a head, how many sheep can be bought for $280?

14. $9 are $\frac{1}{4}$ of how many dollars?

15. How many fourths of a yard in $4\frac{3}{4}$ yards? In $6\frac{1}{4}$ yards?

16. How many eighths in $6\frac{3}{8}$ ft.? In $4\frac{5}{8}$ in.? In $7\frac{7}{8}$ gal.?

17. How many fifths of a bushel in $7\frac{3}{5}$ bu.? In $4\frac{2}{5}$ bu.? In $6\frac{4}{5}$ bu.?

18. Find the sum of $\frac{1}{2}$ and $\frac{3}{4}$. $\frac{2}{3}$ and $\frac{5}{6}$.

19. Find the sum of $\frac{3}{4}$ and $\frac{7}{8}$. $\frac{2}{3}$ and $\frac{1}{5}$.

20. Find the difference between $\frac{2}{3}$ and $\frac{3}{7}$. $\frac{4}{5}$ and $\frac{3}{4}$.

21. A boy had 20 marbles, and sold $\frac{1}{4}$ of them at 2¢ each. How many marbles had he left? How much money did he receive?

ORAL.

1. Find $\frac{1}{4}$ of 24. $\frac{1}{8}$ of 32. $\frac{1}{9}$ of 81. $\frac{1}{5}$ of 35.

2. Into how many parts must you divide an apple in order to give $\frac{1}{3}$ of it to your brother? Why?

3. Into how many equal parts must you divide an apple in order to give your brother exactly $\frac{1}{3}$ of it? Why?

4. In 5 pounds of coffee, how many thirds of a pound?

5. In 8 gallons, how many thirds of a gallon?

6. If you divide 6 apples among your playmates, giving each playmate $\frac{1}{3}$ of an apple, how many playmates have you?

7. Divide 6 apples equally among 18 playmates. What part of an apple have you given to each playmate?

8. How many thirds in $\frac{2}{3}$ of an apple?

9. In $\frac{1}{2}$ of a bushel there are how many sixths of a bushel?

10. Give $\frac{2}{3}$ of an orange to your sister. What part of the orange did you give her?

11. If you give each playmate $\frac{3}{4}$ of a pear, to how many playmates would you give 5 pears?

12. How many pints in 12 quarts?

13. How many pints in 1 peck?

14. How many bushels in 48 pecks?

15. If 5 peaches cost 15 cents, what will 9 peaches cost?

16. If 9 oranges cost 36 cents, what will 5 oranges cost?

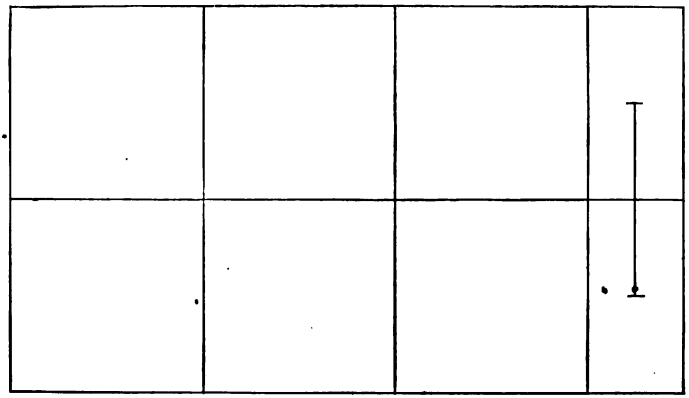
17. At \$4 a yard, how many yards of broadcloth can be bought for \$36?

18. At 4¢ a yard, how many yards of ribbon can be bought for 36 cents?

19. I sold a cow for \$38, which was \$9 more than it cost. How many dollars did it cost?

20. There were 13 pears on a tree, but the wind blew off 2, and a boy picked 3. How many pears are left?

21. When 4 oranges cost 20 cents, what will 9 cost?



How many square inches in a rectangle 3½ in. long and 2 in. wide? *See illustration.*

Make drawings, and find the area of each of the following rectangles:

1. A rectangle 3 in. long by 2½ in. wide.
2. A rectangle 4½ in. long by 2 in. wide.
3. A rectangle 4½ in. long by 3 in. wide.
4. A rectangle 4 in. long by 2½ in. wide.
5. A rectangle 4 in. long by 3½ in. wide.
6. A rectangle 5½ in. long by 2 in. wide.
7. A rectangle 5½ in. long by 3 in. wide.
8. A rectangle 5½ in. long by 4 in. wide.
9. A rectangle 5 in. long by 4½ in. wide.
10. A rectangle 5 in. long by 3½ in. wide.
11. A rectangle 5 in. long by 2½ in. wide.
12. A rectangle 6 in. long by 2½ in. wide.
13. A rectangle 6 in. long by 3½ in. wide.
14. A rectangle 6 in. long by 4½ in. wide.
15. A rectangle 6 in. long by 5½ in. wide.
16. A rectangle 6½ in. long by 4 in. wide.
17. A rectangle 6½ in. long by 2 in. wide.

ORAL.

1. What will 2 yd. of cloth cost, if 5 yd. cost 40 cents?

2. How long will 1 bushel of oats last, if 8 qt. are used each day?

3. How long will 32 quarts of oats last, if 1 peck is used each day?

4. How long will 1 bushel of oats last, if 1 peck is used each day?

5. If you can buy 2 sheets of paper for a cent, what will 1 quire cost?

6. Four pentagons have how many more angles than four squares?

7. A boy has a quarter of a dollar, a dime, a five-cent piece, and two cents. How much money has he?

8. What four equal numbers make 64?

9. A boy had 4 doz. bananas, and gave away 40. He sold the rest at 3¢ each. How much did he receive for them?

10. One ox wears 8 shoes. How many yoke of oxen will wear 32 shoes?

11. Grace studied 30 minutes every day. How many hours did she study in 4 days?

12. Nellie spent 49 days of her vacation at her grandfather's farm. How many weeks was she there?

13. 45 cents will buy 9 yd. of calico. What will 1 yd. cost?

14. How many faces have 8 cubes?

15. How many pecks in 9 bushels?

16. How many quarts in 6 pecks?

17. Make change for 82 cents out of a dollar.

18. Make change for 56 cents out of 3 quarters.

19. Make change for 33 cents out of a dollar.

20. If I give you a $2 bill for a purchase of 27 cents, how much change must you give me?

Add:

1.	2.	3.	4.	5.	6.
364	756	705	305	271	274
204	563	50	415	205	740
328	314	270	27	51	316
506	142	8	712	362	165
284	256	563	172	627	172
421	565	632	845	413	721
215	301	830	819	135	146

Add:

7.	8.	9.	10.	11.	12.
465	810	513	513	123	52
654	103	132	136	50	863
324	375	764	152	721	24
423	758	51	527	19	407
560	26	512	830	678	53
78	674	380	123	768	563

Subtract:

13.	14.	15.	16.	17.	18.
253	537	378	786	862	625
213	131	312	123	232	321

Subtract:

19.	20.	21.	22.	23.	24.
472	725	258	589	894	947
212	124	242	423	232	321

Subtract:

25.	26.	27.	28.	29.	30.
876	769	695	958	587	542
586	592	478	379	326	478

ORAL.

1. If 8 oranges cost 48 cents, what will 1 orange cost?

2. If a gill of milk costs 2 cents, what will a quart cost?

3. Mary had 6 apples, and gave ¼ of an apple to each of a number of boys. To how many boys did she give the apples?

4. Grace has ¼ of an apple. To how many can she give ⅛ of an apple?

5. If a man earns $36 in a week, how much does he earn in a day?

6. If I have ½ of an apple, to how many can I give ⅛ of an apple?

7. If I eat ⅛ of a loaf of bread every day, how many loaves of bread shall I eat in a week?

8. How many yards in a stick 18 ft. long?

9. If 2 boys can pile up some wood in 6 days, how long will it take 4 boys to do it?

10. At $2 a day, how much will a man earn from Wednesday noon to Saturday night?

11. What is 25% of a gallon?

12. What is 33⅓% of a yard?

13. What is 50% of a quart?

14. What is 50% of a peck?

15. A gallon of milk costs 24 cents. How much is it a quart?

16. How many apples can I get for 10 cents, at the rate of 6 apples for 3 cents?

17. If I have 25 apples and eat 20% of them, to how many boys can I give the rest, giving an apple to each boy?

18. Are all fourths of an apple the same size? Are all halves the same size?

19. I heard a boy say, "You have taken the bigger half." What did he mean?

Multiply:

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
35	46	56	65	85	47	76	43	38	64
6	7	8	7	8	6	4	8	7	3

11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
75	87	45	43	45	87	85	76	75	18
6	7	3	4	5	6	7	8	5	6

Divide:

21.	22.	23.	24.	25.	26.
6)324	2)238	3)573	2)426	3)432	3)333

27.	28.	29.	30.	31.	32.
5)525	3)414	4)468	4)472	4)520	5)650

33.	34.	35.	36.	37.	38.
6)858	6)786	6)672	7)854	7)952	7)707

39.	40.	41.	42.	43.	44.
8)896	8)944	9)999	9)909	9)981	5)585

Subtract:

45.	46.	47.	48.	49.	50.	51.	52.	53.
673	512	718	641	713	689	711	413	258
484	376	429	465	896	473	689	117	197

54.	55.	56.	57.	58.	59.	60.	61.	62.
863	612	417	517	729	563	715	881	363
548	496	368	388	518	278	467	595	178

ORAL.

1.	(——) × (——) = 24.	2.	(——) × (——) = 40.
3.	(——) × (——) = 36.	4.	(——) × (——) = 88.
5.	(——) × (——) = 72.	6.	(——) × (——) = 77.
7.	(——) × (——) = 12.	8.	(——) × (——) = 60.
9.	(——) × (——) = 15.	10.	(——) × (——) = 24.
11.	(——) × (——) = 42.	12.	(——) × (——) = 54.
13.	(——) × (——) = 25.	14.	(——) × (——) = 66.
15.	(——) × (——) = 18.	16.	(——) × (——) = 14.
17.	(——) × (——) = 99.	18.	(——) × (——) = 63.
19.	(——) × (——) = 84.	20.	(——) × (——) = 70.
21.	(——) × (——) = 64.	22.	(——) × (——) = 32.
23.	(——) × (——) = 56.	24.	(——) × (——) = 85.
25.	(——) × (——) = 16	26.	(——) × (——) = 27.
27.	(——) × (——) = 28.	28.	(——) × (——) = 81.
29.	(——) × (——) = 30.	30.	(——) × (——) = 90.
31.	(——) × (——) = 21.	32.	(——) × (——) = 108.
33.	(——) × (——) = 35.	34.	(——) × (——) = 144.
35.	(——) × (——) = 49.	36.	(——) × (——) = 121.
37.	(——) × (——) = 48.	38.	(——) × (——) = 132.
39.	(——) × (——) = 9.	40.	(——) × (——) = 96.
41.	(——) × (——) = 20.	42.	(——) × (——) = 120.
43.	(——) × (——) = 33.	44.	(——) × (——) = 100.
45.	(——) × (——) = 45.	46.	(——) × (——) = 50.
47.	(——) × (——) = 44.	48.	(——) × (——) = 55.
49.	(——) × (——) = 75.	50.	(——) × (——) = 80.
51.	(——) × (——) = 78.	52.	(——) × (——) = 65.
53.	(——) × (——) = 68.	54.	(——) × (——) = 82.
55.	(——) × (——) = 26.	56.	(——) × (——) = 110.

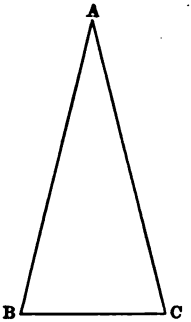


Fig. 1.

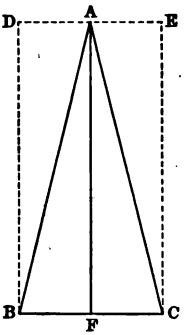


Fig. 2.

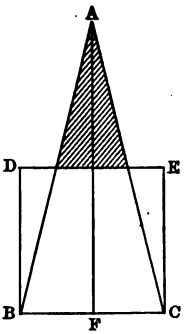


Fig. 3.

1. What is the figure A B C called? (Fig. 1.)

2. How does the side A B compare in length with A C?

3. When two sides of a triangle are equal, we call it an Isosceles triangle. Write the word. Learn to spell it.

4. What is an Isosceles triangle?

5. B D E C (Fig. 2) is what figure?

6. What part of the rectangle, B D E C, is the triangle, A B C? How do you know it?

7. If B C is 2 in. and A F is 4 in., what is the area of the rectangle?

8 What, then, would be the area of the triangle, A B C?

9. In Fig. 3, how was the rectangle, B D E C, made from the triangle, A B C?

10. How does the area of the rectangle, B D E C, compare with the area of the triangle, A B C?

11. How does the height of this rectangle compare with the height of the triangle?

12. If the height of the triangle is 4 in., what is the height of the rectangle?

13. If the base of the triangle is 2 in. and the height 4 in., what is the area of the rectangle, B D E C?

14. What is the area of the triangle, A B C?

ORAL.

1. What will seven hundred pounds of sugar cost, at $5 a hundred?

2. If a man earns $7 a week, how much will he earn in 9 weeks?

3. What will 5 bbl. of flour cost, at $6 a barrel?

4. If 4 bu. of wheat make 1 bbl. of flour, how many bushels will be required to make 9 barrels?

5. At $6 a yard, how many yards can be bought for $54?

6. How many dozen eggs, at 12¢ a dozen, can be bought for 108 cents?

7. At $6 a ton for coal, how many tons can be bought for $72?

8. If 7 yd. of ribbon cost 70 cents, what will 2 yd. cost? 5 yd.?

9. Paid $36 for 12 sheep; how much did 1 sheep cost?

10. If 3 qt. of berries cost 36 cents, what do 5 qt. cost?

11. If 4 yd. of cloth cost $12, what do 9 yd. cost?

12. Bought 9 bbl. of flour, at $6 a barrel, and paid for it in coal, at $6 a ton. How many tons of coal did it take?

13. How much does ¼ of an acre of land cost, at $36 an acre?

14. How much does 25% of an acre of land cost, at $36 an acre?

15. How much will 50% of a gallon of vinegar cost, if 1 gal. costs 24 cents?

16. How much will 2 qt. of vinegar cost, if 1 gal. costs 24 cents?

17. How much will ½ a gallon of vinegar cost, if 1 gal. costs 24 cents?

18. If you had $64, how many barrels of flour could you buy at $8 a barrel?

1. Change to whole or mixed numbers and illustrate:
$\frac{7}{3}$ $\frac{4}{2}$ $\frac{12}{3}$ $\frac{8}{3}$ $\frac{8}{4}$ $\frac{10}{8}$ $\frac{12}{8}$ $\frac{8}{4}$ $\frac{8}{4}$ $\frac{11}{8}$

2. Change to fractional form and illustrate:
$4\frac{7}{8}$ $2\frac{2}{3}$ $3\frac{1}{3}$ $3\frac{3}{4}$ $4\frac{1}{2}$ $3\frac{1}{8}$ $5\frac{4}{8}$

3. Illustrate and add:
$\frac{2}{3}+\frac{3}{4}$ $\frac{3}{8}+\frac{3}{4}$ $\frac{3}{3}+\frac{2}{3}$ $\frac{2}{3}+\frac{5}{8}$ $2\frac{1}{2}+3\frac{3}{4}$

4. Illustrate and subtract:
$\frac{3}{4}-\frac{1}{2}$ $\frac{8}{15}-\frac{2}{5}$ $\frac{3}{3}-\frac{1}{3}$ $\frac{1}{2}-\frac{1}{8}$ $\frac{5}{8}-\frac{1}{3}$ $\frac{5}{8}-\frac{7}{12}$

5. Add:
31 cents, 23 cents, 5 cents, \$2 and 8 cents.

6. Add:
\$2.65, \$4.64, \$0.70, \$5.25, \$0.05, \$9.99.

Subtract:

7.	8.	9.	10.	11.
\$4.77	\$2.05	\$3.16	\$9.84	\$6.05
3.66	.84	1.24	5.26	1.03

12.	13.	14.	15.	16.
\$9.45	\$7.09	\$4.15	\$1.65	\$1.23
1.62	4.26	2.88	0.98	0.75

Add:

17.	18.	19.	20.	21.
683	341	281	74	722
217	413	408	128	843
241	922	37	763	711
812	961	456	574	126
422	426	891	43	238
635	731	78	290	832

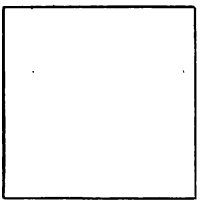
ORAL.

1. 64 is how many times 8? 4?
2. 42 is how many times 6? 7?
3. 40 is how many times 8? 5? 10?
4. If 72 peaches are divided equally among 8 boys, how many does each receive?
5. If 5 horses eat 10 tons of hay in 6 months, how many tons will 7 horses eat in the same time?
6. How many yards of cloth at $8 a yard will it take to pay for 6 tons of coal at $8 a ton?
7. If a barrel of apples is worth $3, what part of a barrel will $1 buy?
8. If $2 will buy 1 bbl. of apples, how many barrels will $7 buy?
9. If ¼ of a pie costs 2 cents, what will ½ of the pie cost? The whole pie will cost how much?
10. What is ⅓ of 12 lemons?
11. If wood is $7 a cord, how many cords can be bought for $8?
12. If 9 men can do a piece of work in 8 days, how many men can do the same work in 12 days?
13. If you cut each of 3 apples into thirds, how many pieces will you have?
14. How many fifths in 6⅘?
15. How many yards of cloth at 7¢ a yard can you buy for 49 cents?
16. If a boy has 30 cents, and buys tops at 8¢ each, how many tops can he buy? At 5 for a cent how many marbles can he buy with the rest of his money?
17. How many spools of thread at 4¢ each can you buy for 25 cents? How many cents will you have left?
18. How many halves are there in 3½? In 7½? In 5?
19. A boy has $2¼. How much will he have left after buying a ball for 25 cents?

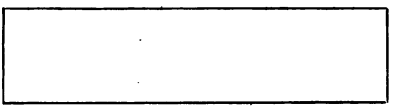
1. Two little girls each made a flower garden. One made hers in the form of an isosceles triangle, with the base 12 ft. and the altitude 10 ft. The other made hers in the form of a rectangle 12 ft. long and 5 ft. wide. Which girl had the larger bed?

2. A father gave each of his two boys a piece of land 30 ft. long and 10 ft. wide. One boy divided his by making a path from the upper right-hand corner to the lower left-hand corner. In what shape was each part? What was the area of each part?

3. The other boy divided his piece by making a path from the middle of the upper side to the middle of the lower side. In what shape was each part? What was the area of each part?

4. 

Suppose in this figure that $\frac{1}{8}$ of an inch represents 1 yard. Find the distance round the figure and also its area.

5. 

Suppose that $\frac{1}{4}$ of an inch represents a yard. Find the area and perimeter of this figure.

6. I have a box 8 ft. long, 7 ft. wide, and 6 ft. deep. How many blocks can I pile into it, if each block is just a cubic foot.

7. How many square feet of cloth will it take to cover the top and sides of this box?

8. How many square yards in the floor of a room 15 yd. long and 9 yd. wide?

9. How many sq. ft. in the ceiling of the same room?

10. How many square feet in one end of the same room if the room is 10 ft. high?

ORAL.

1. At 8¢ a mile, what will it cost to ride 9 miles?

2. What will 9 qt. of cherries cost, at 12¢ a quart?

3. If 4 men can do a piece of work in 6 days, how long will it take 1 man to do it?

4. How many quarts in 7 pk. 3 qt.?

5. How many pecks in 20 bu. 3 pk.?

6. If a bag of flour will last 8 persons 12 days, how long will it last 1 person?

7. What will 8 lb. of maple-sugar cost, at 9¢ a pound?

8. How many feet in 12 yd. 2 ft.?

9. How many quarts in 3 gal. 3 qt.?

10. If two men start from the same place and travel in opposite directions, one at the rate of 4 miles an hour, the other 3 miles an hour, how far apart will they be in 3 hours?

11. What is one of the five equal parts of 30?

12. What part of 4 is 1?

13. What is $\frac{1}{8}$ of 24? 32? 40? 48?

14. How many tons of coal, at $7 a ton, can be bought for $63?

15. A farmer sold 5 tons of hay at $12 a ton, and took his pay in flour at $6 a barrel. How many barrels did he receive?

16. An express train travelled 360 miles in 9 hours. At what rate per hour was that?

17. How many cords of wood at $4 a cord will pay for 8 pairs of boots at $6 a pair?

18. I bought a watch for $36, and sold it so as to gain 25%. How much did I gain?

19. I bought a watch for $36, and sold it so as to lose $33\frac{1}{3}$%. How much did I lose?

20. If you have $1 to buy 8 yd. of muslin at 12¢ a yard, how much will you have left after making the purchase?

1. Change $6\frac{5}{6}$ to sixths.
2. Change $5\frac{3}{4}$ to fourths.
3. Change $4\frac{3}{8}$ to eighths.
4. Change $9\frac{3}{5}$ to fifths.
5. Change $\frac{7}{2}$ to a mixed number.
6. Change $\frac{17}{4}$ to a mixed number.
7. Change $\frac{19}{3}$ to a mixed number.
8. Change $\frac{23}{4}$ to a mixed number.
9. What will 9 lb. of tea cost, at 67¢ a pound?
10. If my hens lay, on an average, 9 eggs a day, from June 10 to July 28, how many eggs do they lay during that time?
11. A farmer bought at the store 18 pounds of sugar at 8¢ a pound, and paid for it with potatoes. If he gave 3 bushels of potatoes, how much was he allowed a bushel?
12. How much will you receive for 8 cows, at $45 each? If they cost you $325, how much did you gain?
13. If you give a 2-dollar bill for 8 lb. of beef at 15¢ a pound, how much change ought you to receive?
14. How many yards of fence will it take to enclose a field 54 ft. long and 36 ft. wide?
15. How many square inches in the top of a desk that is 2 ft. 6 in. long and 8 in. wide?
16. How many inches is it round the desk?
17. Make 5 problems about articles bought at a grocery store, to illustrate "change".
18. The same at a market.
19. The same at a shoe-store.
20. The same at a dry-goods store.
21. The same at a fruit and candy store.
22. A man sold 9 cows at $22 each, and a horse for $130. How much did he receive for them all?
23. If you read 23 pages each day, how many pages will you read in a week?

ORAL.

1. A girl has divided an apple into 3 equal parts, and given away one of the parts. What part of the apple was given away?

2. A boy having 5 cents spends one of them. What part of his money has he spent?

3. A farm was divided equally among 3 sons and 4 daughters. What part of the farm did 1 daughter get? What part did the 4 daughters get?

4. A boy had $3.25, and spent $2. How much money had he left?

5. A girl cut $\frac{1}{2}$ of an apple so as to make fourths of an apple. How many fourths did she make?

6. If you had $\frac{1}{4}$ of an orange, how many eighths of an orange could you get out of it?

7. Change $\frac{1}{3}$ to twelfths.

8. How many fifths in $3\frac{3}{5}$?

9. Begin with 8, and count by 9's to 99.

10. Begin with 7, and count by 9's to 99.

11. Begin with 6, and count by 9's to 99.

12. Begin with 5, and count by 9's to 99.

13. On 1 rose bush there are 12 roses, on another 8, and on a third 9. How many roses in all?

14. I spent 5 cents for a top, 6 cents for a kite, and have 10 cents left. What had I at first?

15. If I buy a knife for 9 cents and sell it for 16 cents, what do I gain?

16. A cask when full contained 15 gallons. After 6 gallons had been drawn out, how many gallons remained?

17. A boy has 17 marbles, and gives away 9. How many has he left?

18. A man rode 16 miles, and walked 13 miles. How many miles did he travel?

19. What part of a foot is 9 inches?

1. Add: $17.41, $82.74, $63.89, $78.23, $67.98, $27.14, $19.19, $24.81, $18.00, $42.18, $24.04, $87.21.

2. Change 144 cents to dollars and cents.

3. A farmer sold 60 bu. of apples at $2 a bushel. How many pigs can he buy at $4 each with the money?

4. What is the cost of half a bushel of beans at 8¢ a quart?

5. What is the cost of 2 bu. of apples at 30¢ a peck?

6. What is the cost of 12 doz. eggs at 1¢ each?

7. What is the cost of 9 doz. oranges at 12¢ a half dozen?

8. What is the cost of 6 gal. of oil at 2¢ a pint?

9. How many feet in 6 yd. 2 ft.?

10. How many pecks in 3 bu. 4 pk.?

11. How many quarts in 4 pk. 6 qt.?

12. How many quarts in 19 gal. 3 qt.?

13. How many pints in 3 qt. 1 pt.?

14. What is the cost of 76 cords of wood at $5 a cord?

15. If ½ of a pound of sugar costs 3¢, what will 9 pounds cost?

16. If 1 doz. lemons cost 36 cents, what will 50 lemons cost?

Find the cost:

17. Of 4 lb. of coffee at 28¢ a pound.

18. Of 4 lb. of tea at 75¢ a pound.

19. Of 10 lb. of sugar at 12¢ a pound.

20. Of 9 lb. of rice at 11¢ a pound.

21. Of 8 cans of peaches at 35¢ a can.

22. Of 7 cans of tomatoes at 27¢ a can.

23. Of 16 yd. of muslin at 9¢ a yard.

24. Of 9 yd. of flannel at 35¢ a yard.

25. Of 6 pairs of socks at 37¢ a pair.

26. Of 7 yd. of trimming at 14¢ a yard.

27. Of all the articles in the last four examples.

ORAL.

1. When cheese is 18 cents a pound, how much can I buy for 6 cents?

2. Two boys have made a snowman 6 ft. high. How many yards high is he?

3. I saw 6 sleds going down a hill, and on each sled was 1 girl and 2 boys. How many children did I see sliding down hill?

4. How many peaches can Grace buy for 18 cents at 12¢ a dozen?

5. What must I pay for ½ gallon of oil at 4¢ a pint?

6. If bananas are 5 cents each, how much less than 18 cents must you pay for ¼ dozen?

7. Charles is 19 years old and his sister Mary is 7 years younger. How old is Mary?

8. A farmer had 13 sheep, but 3 died; then he killed 2, and bought 9 more. How many had he then?

9. A teacher gave every pupil in her class a cent. If she used two dimes, how many are in her class?

10. If I have 5 apples, and cut each of them into fourths, to how many children can I give each one piece?

11. What will 2½ pounds of rice cost at 8 cents a pound?

12. Alice's father gave her $2 every two months. How many dollars did he give her in a year?

13. If Grace drinks 1 pint of milk every day, how many days will it take her to drink 1 gallon?

14. Ned and Dick each have a peach tree. There are 26 peaches on Ned's tree, but only ½ as many on Dick's tree. How many peaches on Dick's tree?

15. If apples are 2 cents each, how much must I pay for ¾ of a dozen?

16. What 9 equal pieces of money make 45 cents?

17. If a box cover is 7 in. long and 6 in. wide, how many square inches does it contain?

Add:

1.	2.	3.	4.	5.	6.
27	96	27	88	78	65
46	85	34	77	78	74
53	74	97	66	78	83
62	63	89	55	78	92
78	52	77	44	78	57
94	41	66	33	78	48
87	30	88	22	78	39
95	29	47	11	78	62
36	18	38	16	78	71
44	46	14	18	78	80

Add:

7.	8.	9.	10.	11.
126	246	129	247	633
325	272	264	247	363
475	316	725	247	336
672	419	436	247	478
875	792	844	247	748
127	748	712	247	874
455	899	678	247	847
674	463	426	247	784
555	571	815	247	517
472	843	704	247	751

Multiply:

12.	13.	14.	15.	16.	17.
84	76	98	45	68	94
6	7	7	5	6	4

Multiply:

18.	19.	20.	21.	22.	23.
87	75	67	47	57	78
4	7	8	6	5	8

ORAL.

1. I saw a window in the shape of an isosceles triangle. How many square feet in the window if it is 4 ft. wide and 6 ft. high?

2. A boy gave away 4 cents, which was $\frac{1}{3}$ of all he had. How many cents had he?

3. If 4 men can do a piece of work in 8 days, how many men can do it in one day?

4. A girl had 27 apples. She kept 7, and divided the rest equally among 5 of her playmates. How many apples did each playmate receive?

5. How many halves in $3\frac{1}{2}$? Why?

6. How many dollars in 500 cents?

7. A boy had 68 cents in dimes and 2-cent pieces. How many dimes had he, if he had four 2-cent pieces?

8. A girl had 78 cents in her purse. If there were 3 quarters, how many cents did she have?

9. A man travels 9 hours a day for 36 hours. How many days does he travel?

10. If you buy a yard of ribbon for 27 cents, and a spool of thread for 5 cents, how much change will you receive back from a quarter and a dime?

11. I bought 30 doz. of eggs, and 20% of them were bad. How many were bad?

12. There were 24 gal. of kerosene in a barrel, but $33\frac{1}{3}\%$ leaked out. How many gallons remained?

13. A train of cars ran 20 miles in an hour. The next hour it ran 25% more miles than it had the first hour. How many miles did it go the second hour?

14. If 7 bbl. of flour cost \$42, what will 4 bbl. cost?

15. If 4 tons of hay cost \$48, what will 7 tons cost?

16. If 9 quarts of milk cost 54 cents, what will 7 quarts cost?

17. Find the area of a rectangle 4 in. long and 6 in. wide.

1. How many feet of wire will it take to go twice round a rectangular grass-plot 65 ft. long and 15 ft. wide?

2. A bed of flowers is in the form of a triangle, having a base of 50 ft. and an altitude of 5 ft. Find its area.

3. A room is 19 ft. long, 14 ft. wide, and 9 ft. high. Find the number of square feet in one end. In the two ends. In one side. In the two sides. In the two ends and the two sides.

4. A box is 3 ft. long, 2 ft. wide, and 1 ft. high. If you paint the top and sides, how many square feet of painted surface have you? How much does it cost to paint it at 3¢ a foot?

5. If you should fill this box with 1 ft. cubic blocks, how many rows of blocks would you have in the bottom layer? How many in each row? How many blocks in the bottom layer? How many blocks in the box?

6. How many square feet in a triangle whose base is 18 ft. and altitude 8 ft.?

7. What is the entire surface of a cubical box, each of whose dimensions is 2 feet?

8. What is the cubic contents of this same box?

9. How many square yards are there in a lawn 18 yards square?

10. How many feet of tape will it take to bind a slate if it is 18 in. long and 12 in. wide?

11. Draw 2 right-triangles and 2 isosceles triangles.

12. A man travels 13 miles an hour; how far will he travel in 8 hours?

13. How many yards in 66 ft.?

14. What will 8 lb. of butter cost at 33¢ a pound?

15. $324 taken from what sum leaves $143?

16. Three boys have 43 quarts of nuts, and they gather 32 quarts more. If they divide them equally among themselves, how many quarts will each boy receive?

1. If you cut 12 ft. from a kite string 23 ft. long, how many feet of string will remain?

2. $50 were paid for calves at the rate of $5 each. How many calves were bought?

3. How many legs and wings have 9 flies?

4. How many dollars are there in 50 dimes? In 200 cents?

5. Harry spent 12 cents, which was ¼ of what he had. How many cents did he have at first? How many did he have left?

6. When bananas are 24¢ a dozen, how many can Mary buy for 12 cents? For 36 cents?

7. How many quarts in ½ of a gallon? In ½ of a peck?

8. How many inches in ⅓ of a yard? In ⅓ of a foot?

9. Name the Autumn months. Tell how many days there are in each of the months.

10. What will 2½ yd. of calico cost at 12¢ a yard?

11. At 12¢ a quire, what will 10 sheets of paper cost?

12. How many yards of ribbon can you buy for 30 cents when 15 cents will buy 5 yards?

13. If 1 qt. of berries costs 9 cents, what will 1 pk. cost?

14. How much will 11 tons of coal cost, if 6 tons cost $36?

15. George sold Henry 5 stamps and Dick 6. They paid him 8 cents for each stamp. How many cents did he receive?

16. In our school-room there are —— windows and —— panes of glass in each window. In the room there are —— panes of glass.

17. There were 20 cents in a box, when John put in 14 cents, Mary 5, and Lucy 8. How many cents were in the box then?

18. If apples cost 2¢ each, and peaches 3¢ each, what is the cost of 5 apples and 6 peaches?

1. Add: 721, 634, 384, 897, 974, 542, 134, 346, 875, 65, 303, 397.

2. A gentleman gave $125, for a horse, $162 for a carriage, $84 for a harness, and $5 for a whip. What did all cost him?

3. A merchant sold 321 bbl. of flour on Monday, 143 bbl. on Tuesday, 235 bbl. on Wednesday, 197 bbl. on Thursday, 181 bbl. on Friday, and 202 bbl. on Saturday. How many barrels did he sell in all?

4. If he received $6 a barrel for the flour, how many dollars did he receive each day?

5. An ox was killed and divided into 4 parts, called quarters, weighing respectively 145 lb., 209 lb., 184 lb., and 186 lb. What did the ox weigh?

6. What is the ox worth at 5¢ a pound?

7. How many dollars will you give to 9 persons, if each person receives $38 less $9?

8. Tom has 25 marbles and Dick has 9 times as many as Tom, less 19 marbles. How many marbles has Tom?

9. How many tons of coal, worth $6 a ton, will it take to pay for 18 bbl. of flour at $7 a barrel?

10. A grocer bought 21 lb. of butter of one man, 20 lb. of another, 8 lb. of another, and 23 lb. of another. He packed it in boxes holding 9 lb. each. How many boxes did it take?

11. A boy having 56 oranges lost 14 of them, and divided the rest equally among 7 of his playmates. How many oranges did each playmate receive?

12. Multiply 7 by 8, add 10, divide by 11, add 21, divide by 9, multiply by 12, add 12, divide by 8, multiply by 11, divide by 6. Write the result.

Subtract:	**13.**	**14.**	**15.**	**16.**	**17.**	**18.**
	476	523	679	731	869	916
	289	473	368	574	673	844

ORAL.

1. 6 is $\frac{1}{8}$ of what number? 12 is what part of 24?

2. An orchard has 54 trees in 6 rows. How many trees are in a row?

3. I went to the store with 10 cents, and spent 5 cents. What part of my money did I spend? What per cent of it did I spend?

4. I spent 12 cents out of 36 cents. What part of my money did I spend? What per cent of it did I spend?

5. If 6 chickens cost \$1, what will 12 chickens cost? 24 chickens?

6. A man having \$24, paid \$6 for a hat. What part of his money did he spend? What per cent of his money did he spend? How many dollars did he have left?

7. Find the cost of 9 lb. of cheese at 6¢ a pound.

8. Make an example to include 3 purchases at a grocery store, but the sum spent must be less than \$1. Make change.

9. Make an example to illustrate change from a \$5 bill and to include 3 purchases at a dry-goods store.

10. If a cow gives 6 qt. of milk a day, how many gallons does she give in 6 days?

11. How many minutes in $\frac{1}{6}$ of an hour?

12. How many hours in $\frac{1}{8}$ of a day?

13. What will $\frac{1}{7}$ of 49 yd. of cloth cost at \$5 a yard?

14. How many inches are there in a line 7 ft. long?

15. \$28 is \$7 more than 3 tons of coal cost. What does 1 ton cost?

16. A boy, being asked how many marbles he had, replied, "If I had 7 times as many, I should have 84." How many marbles had he?

17. At 12¢ an hour, how many hours will it take you to earn enough to buy a bat and ball if they cost 72 cents?

1. A grocer sold $7\frac{3}{4}$ lb. of butter to one man, $5\frac{1}{4}$ to another, and $4\frac{1}{4}$ to another. How many pounds did he sell in all?

2. If I walk $3\frac{3}{4}$ miles one day, and $4\frac{3}{4}$ miles the next, how many miles do I walk in all?

3. In $10\frac{1}{5}$ there are how many fifths?

4. 45 is $\frac{3}{5}$ of what number?

5. What is $\frac{3}{5}$ of 45?

6. 24 is $\frac{3}{4}$ of what number?

7. What is $\frac{3}{4}$ of 24?

8. Make 2 examples to illustrate how to find the whole cost when the cost of one article and the number of articles are given.

9. Make 2 examples to illustrate how to find the number of articles that can be bought when the price of one article and the whole sum of money is given.

10. If 3 lb. of butter cost 75 cents, what will 5 lb. cost?

11. Add: $\frac{1}{2}$ and $\frac{3}{8}$, $\frac{3}{4}$ and $\frac{5}{8}$, $\frac{1}{2}$ and $\frac{1}{8}$.

12. Subtract: $\frac{5}{8}$ and $\frac{3}{8}$, $\frac{11}{12}$ and $\frac{1}{4}$, $\frac{7}{10}$ and $\frac{3}{5}$.

13. Find the cost of 175 lb. of rice at 7¢ a pound.

14. A steamer sails 275 miles a day. How far does she sail in 9 days?

15. Find the cost of 8 carriages at $218 each.

16. How many inch cubes can you pile into a box 12 in. long, 8 in. wide, and 9 in. deep? How many blocks are there in the bottom layer?

17. In the last example, how many blocks can you put in one row? How many rows are there in the bottom layer? How many layers are there?

NOTE. — Do not let the pupils get the idea that they must first find the square feet in the bottom, or that square feet can be multiplied by feet in height to find cubic feet. Hold fast to the idea of the number of cubic inches in one row and the number of rows in a layer and the number of layers.

ORAL.

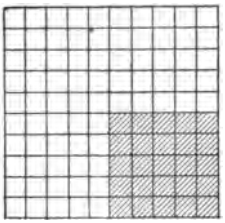


Fig. 1.

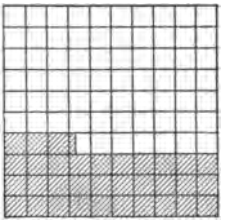


Fig. 2.

1. How many little squares in Fig. 1?
2. How many little squares in the part not crossed off?
3. We call this 75% of the square. Can you tell why?
4. What part of the whole square is 75% of it?
5. 75% is how many times 25%?
6. Draw a line 12 in. long. Cross off 75% of it. What per cent have you not crossed off?
7. Copy and learn: 75% of an article is $\frac{3}{4}$ of it.
8. Find 75% of 16 apples. Find 75% of $20.
9. Find 75% of 36 oranges. Of 24 horses.
10. In Fig. 2 how many parts are not crossed off? What per cent, then, is not crossed off?
11. What part is crossed off? What part is not crossed off?
12. What part of anything, then, is $66\frac{2}{3}\%$ of it?
13. How much larger is $66\frac{2}{3}\%$ of an apple than $33\frac{1}{3}\%$ of it?
14. Find $66\frac{2}{3}\%$ of 9. Of 27. Of 36.
15. Draw 2 squares on the board each 12 in. Cross off 75% of one of them and $66\frac{2}{3}\%$ of the other.
16. Draw 2 circles. Cross off from one of them 75% of it. Cross off from the other $66\frac{2}{3}\%$ of it.
17. Which is larger, 75% of 28 or $66\frac{2}{3}\%$ of 30? How much larger?

1. From a flock of seven hundred six hens there were sold at one time one hundred ten, and at another time three hundred sixty-five. How many hens remained?

2. Find out how many pupils are present to-day in each room on the first floor of your building. How many are present in all?

3. Find the same for the second floor.

4. A man had 400 hens, and sold 75% of them. How many did he sell?

5. A man had 300 bu. of corn, and sent 66⅔% of it to the mill. How many bushels did he send to the mill?

6. If I should offer you your choice between 75% of 120 marbles and 66⅔% of 120 marbles, which would you choose? Find out if you have chosen the larger number?

7. Write in a column the names of the months, and opposite each the number of days in the month. Add and see how many days there are in a year.

8. Walk round 1 square, counting your steps. If each step was 2 ft., how many feet is it round the square?

9. The distance from B to A is 263 miles, and from B to C is 197 miles. How far is it from A to C? A, B, and C are in the same straight line. Illustrate.

10. Add: Fifty-seven, two hundred sixty-nine, three hundred four, seventeen, four hundred eighty-one.

11. From \$6.21 take \$5.17.

12. Find the cost of 3 knives at \$1.25 each.

13. Add \$2 and 35 cents, \$5 and 41 cents, \$6 and 10 cents, \$3 and 7 cents, \$1 and 5 cents.

14. Add together ½ of 20, ⅓ of 18, ¼ of 36, ⅕ of 60, and 6×4.

15. There are 932 gallons of water in a cistern. If 463 gallons should leak out, how many gallons would remain?

16. Take 6 times 78 from 8 times 89.

ORAL.

1. If marbles sell at the rate of 4 for a cent, how many can I buy for 12 cents?

2. What ten pieces of money make one-half a dollar?

3. How many quarts in $\frac{1}{4}$ of a bushel? How many quarts in a peck?

4. What will $\frac{1}{8}$ of a bushel of corn cost at 6 cents a quart?

5. There are how many pecks in 4 bu. 2 pk.?

6. If a pound of sand is divided into 16 packages, how much does each package weigh?

7. Give the abbreviation for ounce and pound.

8. If I put 4 lb. of sugar into 8 packages, what part of a pound do I put into one package? How many ounces?

9. What will $\frac{1}{2}$ pound of candy cost at 2¢ an ounce?

10. A pint is —— times as large as a gill.

11. 1 gal. = —— qt., or —— pt., or —— gills.

12. From seven o'clock in the morning till 8 o'clock in the evening is how many hours?

13. What will $1\frac{3}{4}$ doz. pears cost at 2¢ each?

14. What will 3 qt. of berries cost at 80¢ a peck?

15. If Florence lives $1\frac{1}{2}$ miles from school, how far does she walk in a school week in going to and from school once a day, 5 days in a week?

16. In a school of 36 pupils how many were boys? How many were girls? $66\frac{2}{3}\%$ were girls.

17. In a school of 36 pupils $\frac{3}{4}$ of them were girls. How many were girls?

18. How much are a quarter of a dollar, a dime, a five-cent piece and 7 cents?

19. What 3 equal numbers make 21?

20. What will 11 boxes of matches cost, at 7¢ a box?

21. How many lead pencils can you buy for 22¢, if 1 pencil costs 2¢? How many if 1 pencil costs 11¢?

22. At 9¢ a pound, what will 10 pounds of sugar cost?

DIVISION.

1.	2.	3.	4.	5.
2)456	3)735	2)736	3)816	2)548
6.	**7.**	**8.**	**9.**	**10.**
3)522	4)876	3)414	4)516	3)522
11.	**12.**	**13.**	**14.**	**15.**
4)628	5)525	4)732	5)785	4)752
16.	**17.**	**18.**	**19.**	**20.**
5)645	6)126	5)550	6)246	2)255
21.	**22.**	**23.**	**24.**	**25.**
6)306	7)217	6)366	7)427	6)612
26.	**27.**	**28.**	**29.**	**30.**
7)434	8)176	7)497	8)648	7)357
31.	**32.**	**33.**	**34.**	**35.**
8)369	9)459	8)792	9)369	8)592

MULTIPLICATION.

36.	37.	38.	39.	40.	41.	42.
650	432	124	666	98	48	76
8	7	5	3	9	7	6

43.	44.	45.	46.	47.	48.	49.	50.
53	98	64	79	58	67	89	46
5	4	8	8	7	5	4	6

ORAL.

1. If 4 men can do a piece of work in 6 days, how long will it take them to do twice as much work?

2. What is $\frac{1}{2}$ of 8? $\frac{1}{3}$ of of 9?

3. How many rods in a field 10 rods square?

4. At \$2 a rod, what will it cost to fence a field 10 rods square?

5. How many square feet in the floor of a room 6 ft. wide and 9 ft. long?

6. How many marbles did a boy lose, if he lost 75% of 48?

7. How far is it around a flower-bed that has 7 sides, and each side 6 ft. long?

8. Make a problem for 7×6. Also for $\frac{1}{7}$ of 42.

9. How many squares, 3 in. on a side, can you cut from a 9-inch square?

10. There are 72 square feet in the floor of a room. What part of the floor is covered with a rug 4 ft. by 2 ft.?

11. If a square is 5 in. on a side, how many square inches does it contain?

12. A gardener has a square flower-bed that contains 36 sq. ft. How many feet in length is each side?

13. If he makes a diagonal path, into what two equal forms has he divided it? How many square feet are there in each, if we do not deduct anything for the width of the path?

14. How many 2-inch squares does an 8-inch square contain?

15. One piece of land contains 4 square feet, another is 4 ft. square. Which piece is the larger, and how many square feet larger?

16. 3 times $\frac{5}{8}$ are how many whole units?

17. 6 times $\frac{5}{8}$ are how many whole units?

18. 4 times $\frac{7}{10}$ are how many whole units?

1. To 43, add 19. Take 27 from the sum.

2. George earned 25 cents one day, 17 cents another, and 37 cents another. How much more must he earn to have a dollar?

3. A farmer cut 7½ tons of hay on 1 piece of land, and 3½ tons on another. How many tons of hay did he cut?

4. At 4¢ an ounce, find the cost of 2 pounds of cloves.

5. How many gallons in 96 pints?

6. A man had 90 barrels of flour. He sold 29 bbl. to one man and 37 bbl. to another. How many barrels had he left?

7. What will be the cost of 1 gal. 1 qt. 1 pt. of milk, at 3¢ a pint?

8. At $3 a day, what will a man earn in 7 working-days?

9. A farmer sold 47 cows, which were ⅛ of his herd. How many cows had he at first?

10. It is 90 miles from New York to Philadelphia. After travelling 66⅔% of the distance, how far have you then to go?

11. How many gallons of molasses are there in two jugs, each containing 7 gal. 2 qt.?

12. How many bags will it take to hold 57 pounds of tea, if you put ½ pound into each bag?

13. A man sold a pound of tea for 60 cents, and lost 15 cents. How much did it cost him?

14. How many ounces are there in 9 pounds?

15. If a horse eats ¼ of a bushel of oats a day, how long will 27 bu. last?

16. If 9 men can do a piece of work in 23 days, how long will it take 1 man to do it?

17. Find the cost of 178 bbl. of cement, at $3 a barrel.

18. Find the cost of 35 thousand bricks at $6 per thousand.

ORAL.

1. John has 6 marbles, and James has 3 times as many less 3, and Henry has as many as John and James. How many has Henry?

2. A teacher receives $9 a week and spends $6. In how many weeks will she save $24.

3. If a man earn $8 a week and a boy $3, how much more will the man earn in 6 weeks than the boy?

4. If 7 men can do a piece of work in 8 days, how long will it take 1 man to do it?

5. Mary is reading a book of 45 chapters. If she reads 9 chapters a day, how many days will it take her to read the book?

6. At $6 a barrel, how many barrels of flour can be bought for $72?

7. How many chairs, at $4 each, can be bought for $36?

8. The sum of 2 numbers is 15, and 1 of the numbers is 7. What is the other?

9. The product of 2 numbers is 42, and one of the numbers is 6. What is the other number?

10. If 6 men can do a piece of work in 8 days, how many men can do it in 4 days?

11. A grocer sold $\frac{1}{8}$ of a cheese to one lady, $\frac{2}{8}$ to another, $\frac{3}{8}$ to another, $\frac{1}{8}$ to another. How many eighths did he have left if he had 2 cheeses at first?

12. A boy had 50 cents, and gave $\frac{1}{2}$ of it for a knife, and $\frac{1}{5}$ of what was left for candy. How many cents had he then?

13. Read the problem above, using per cents instead of the fractions.

14. If $\frac{1}{5}$ of a barrel of flour will last a family 5 weeks, how long will $\frac{2}{5}$ last them? $\frac{3}{5}$?

15. 7 is $\frac{1}{8}$ of what number?

1.	2.	3.	4.	5.
576	432	278	333	278
832	289	179	33	461
45	41	63	3	947
763	5	45	3	75
9	28	7	33	123
178	478	277	333	71
47	915	165	444	726
267	497	741	666	469

6.	7.	8.	9.	10.
666	276	789	147	746
555	794	567	144	57
44	519	432	96	84
3	71	961	801	231
77	275	278	462	642
888	67	167	85	44
22	111	729	897	485
999	75	836	448	584

11.	12.	13.	14.	15.
690	67	373	124	82
909	872	738	115	95
987	436	534	110	178
897	360	96	121	542
28	61	81	487	427
298	294	261	931	912
985	943	619	93	396
589	327	291	87	235
49	54	728	389	78
126	463	135	986	624

ORAL.

1. If 4 pears cost 16¢, how much will 5 pears cost?
2. If 12 inkstands cost 96¢, what will 2 cost?
3. How many men can do as much work in 5 days as 6 men can do in 10 days?
4. How long will it take 1 man to do as much work as 7 men can do in 8 days?
5. How long will it take 2 men to do as much work as 6 men can do in 3 days?
6. How many times 9 in 63? 7 in 63?
7. How many times 6 in 18? 7 in 28?
8. If a man can travel 6 miles an hour, in how many hours can he travel 42 miles?
9. If a man travels 42 miles in 7 hours, how far does he travel in 1 hour?
10. How many hours will it take a man to travel 42 miles, at the rate of 6 miles an hour?
11. At 5¢ a yard, how many yards of ribbon can you buy for 40 cents?
12. If for 40 cents you can buy 8 yd. of ribbon, what is the price of one yard?
13. If 1 yd. of ribbon costs 5 cents, what will 8 yd. cost?
14. If a hogshead of molasses cost $20, for what ought I to sell it to make 20%?
15. I bought a horse for $80, and in selling it I lost 25%. How much did I lose?
16. A man bought a cow for $36, and in selling it gained 33⅓%. How much did he gain?
17. A man bought a yoke of oxen for $100, and in selling, gained 75%. How much did he gain?
18. What is 66⅔% of $48?
19. Count by 7's from 7 to 84, and back.
20. Count by 8's from 8 to 96, and back.
21. Count by 7's from 2 to 51, and back.

SUBTRACTION.

1.	2.	3.	4.	5.	6.
752	505	324	231	747	237
675	384	197	87	563	175
7.	**8.**	**9.**	**10.**	**11.**	**12.**
162	421	370	496	471	390
98	276	189	279	297	289
13.	**14.**	**15.**	**16.**	**17.**	**18.**
908	325	376	623	919	162
706	195	286	574	816	99
19.	**20.**	**21.**	**22.**	**23.**	**24.**
591	722	305	852	143	428
436	574	167	794	76	275
25.	**26.**	**27.**	**28.**	**29.**	**30.**
154	750	644	581	237	812
126	645	556	438	119	706
31.	**32.**	**33.**	**34.**	**35.**	**36.**
626	381	645	804	663	538
575	267	473	764	574	235
37.	**38.**	**39.**	**40.**	**41.**	**42.**
486	970	275	754	242	827
379	816	175	368	198	736
43.	**44.**	**45.**	**46.**	**47.**	**48.**
352	129	544	327	413	147
172	78	376	274	297	126

ORAL.

1. How many gallons of milk will fill a 12-quart pail?

2. Four squares have how many more corners than four triangles?

3. What will 11 rocking-horses cost, at $4 each?

4. A schoolroom has 60 seats in 5 equal rows. How many seats in each row?

5. If you put 5 times 6 apples in a basket and take out 7×4 apples, how many apples will be left?

6. Frank is 8 years old, and he is just $\frac{1}{4}$ as old as his mother. How old is his mother?

7. When cloth is 25 cents a yard, how many yards can you buy for $1?

8. What will be the cost of 9 quarts of beans, at 8¢ a quart?

9. What must you put with 42 to make 50?

10. How many 5-cent pieces make a half-dollar?

11. A room is 4 yd. square; how many feet is it around the room?

12. How many yards are there in 2 rods?

13. A boy can saw $\frac{1}{2}$ a cord of wood in a day. How long will it take him to saw 2 cd.? 4 cd.? 6 cd.? How many cords will he saw in 4 days? 8 days? How many cords will 2 boys saw? 4 boys? 10 boys?

14. At 6¢ a pound, what will 6 lb. 8 oz. of meat cost?

15. 2 cents are what part of 3 cents?

16. What will 1 lb. 4 oz. of butter cost, at 24¢ a pound?

17. How many hours is it from half-past eight in the morning till half-past four in the afternoon?

18. At 12¢ a dozen, what will 18 eggs cost?

19. Place 27 blocks on your desk: take away $\frac{1}{3}$ of them; take away $\frac{1}{3}$ of what are left; take away $\frac{1}{4}$ of what are left; take away $\frac{1}{3}$ of what are left; take away $\frac{1}{3}$ of what are left; take away $\frac{1}{2}$ of what are left; how many blocks have you?

LESSON 112.

MULTIPLICATION.

1.	2.	3.	4.	5.	6.
184	841	235	352	605	134
7	4	9	3	5	6

7.	8.	9.	10.	11.	12.
341	583	358	470	704	731
2	5	6	8	2	3

13.	14.	15.	16.	17.	18.
137	206	602	453	432	154
7	3	8	3	4	6

19.	20.	21.	22.	23.	24.
375	650	232	424	563	615
3	9	3	5	2	5

25.	26.	27.	28.	29.	30.
726	374	363	955	487	294
5	7	4	8	6	3

31.	32.	33.	34.	35.	36.
293	324	344	527	765	486
4	8	5	7	8	4

37.	38.	39.	40.	41.	42.
392	839	677	673	524	682
5	8	9	6	5	5

43.	44.	45.	46.	47.	48.
947	833	796	948	463	247
9	7	7	9	2	3

ORAL.

1. 20 rubbers stood in a row. To how many children did they belong?

2. If you buy 2 gal. of molasses to-day and 2 qt. to-morrow, how many quarts will you buy in all?

3. A little girl wrote 15 words. All but 3 were right. How many were right?

4. Clara is 6 years old. Her sister is 3 years more than 2 times as old. How old is her sister?

5. If John finds 3 eggs in a nest every day, in a week he will find how many less than 2 dozen?

6. How many times is 3 contained in 48?

7. A field is 6 rd. wide and 9 rd. long. Draw a diagram to represent it, with a scale 1 in. to a rod. What is the length and width of a diagram?

8. What is the area of the field named in Ex. 7 in square rods?

9. What is the area of the diagram in square inches?

10. How many rods of fence will it take to enclose the field?

11. How many inches of string will it take to go around the diagram?

6 men earn $60 in 2 days:

12. How much does 1 man earn in 2 days?

13. How much do 6 men earn in 1 day?

14. How much does 1 man earn in 1 day?

15. How much do 3 men earn in 2 days?

16. How much do 3 men earn in 1 day?

17. I have 3 pieces of money which together make 80 cents. What are the pieces?

18. If 10 apples are sold for 5 cents, what would a dozen be sold for?

19. At 8¢ a quart, what will 16 pints of milk cost?

20. Find the cost of 8 lb. of sugar at 7¢ a pound.

1. 2)200	**2.** 3)630	**3.** 3)600	**4.** 4)480
5. 4)800	**6.** 2)220	**7.** 3)900	**8.** 3)369
9. 2)240	**10.** 4)840	**11.** 3)690	**12.** 7)770
13. 2)400	**14.** 5)550	**15.** 2)462	**16.** 4)488
17. 4)844	**18.** 4)208	**19.** 6)486	**20.** 7)357
21. 5)355	**22.** 2)206	**23.** 4)240	**24.** 8)648
25. 2)120	**26.** 3)186	**27.** 6)666	**28.** 5)250
29. 2)864	**30.** 5)555	**31.** 4)240	**32.** 4)260
33. 2)170	**34.** 4)140	**35.** 8)688	**36.** 3)210
37. 7)294	**38.** 8)424	**39.** 3)138	**40.** 6)330
41. 8)432	**42.** 9)585	**43.** 9)567	**44.** 4)140
45. 7)364	**46.** 7)595	**47.** 8)424	**48.** 5)260

49. Divide each of the following numbers by 3, 4, 5, 6, 7, 8, 9.

132	355	342	414	312
240	245	132	288	738
248	160	276	472	441
336	475	546	544	504
384	230	450	336	696

ORAL.

1. A newsboy sold enough 2-cent papers to amount to 24 cents. How many papers did he sell?

2. How many tops worth 6¢ each must a boy give in exchange for 9 marbles worth 2¢ each?

3. What part of a week is a day?

4. How many inches in $1\frac{3}{4}$ ft.?

5. Mrs. B is 32 years old, and her husband is 9 years older. How old is her husband?

6. A tea dealer sold $2\frac{1}{2}$ lb. to one customer, and $4\frac{1}{2}$ lb. to another. How much did he sell to both?

7. A family uses a quart and a pint of milk a day. How many quarts are used in 4 days?

8. How much change will a person receive who buys 11 lb. of lard at 9¢ a pound, and gives a dollar bill in payment?

9. How many cents will 1 oz. of cloves cost at 40¢ for $\frac{1}{2}$ pound?

10. A dealer bought coal for $4.50 a ton, and sold it for $5 a ton. How much did he gain on a ton?

11. If sugar is 3¢ for $\frac{1}{2}$ a pound, what will be the cost of 4 lb.?

12. What will 8 pairs of shoes cost at $4 per pair?

13. Helen picked 12 qt. of berries, and her sister May picked 3 qt. less. How many did both pick?

14. How many ounces are there in 1 lb. and 9 oz.?

15. If 2 spools of thread cost 10 cents, what will 8 spools cost?

16. If a pound of butter costs 24 cents, how much will $\frac{1}{4}$ of a pound cost?

17. If I pay 10 cents for a quarter of a pound of candy, what will a pound cost?

18. If 8 men can do a piece of work in $\frac{1}{2}$ a day, how long will it take 1 man to do the same work?

1. Write all the numbers from 1 to 100 in Roman numerals.

2. What change must you make in writing the numbers between 100 and 200?

Illustrate the following:

3.	4.	5.
$\frac{4}{5} + \frac{1}{5} = ?$	$\frac{1}{2} + \frac{1}{8} = ?$	$\frac{5}{8} + \frac{3}{8} = ?$
$\frac{1}{2} + \frac{1}{4} = ?$	$\frac{1}{2} + \frac{1}{10} = ?$	$\frac{1}{3} + \frac{1}{9} = ?$
$\frac{1}{2} + \frac{1}{8} = ?$	$\frac{1}{2} + \frac{1}{12} = ?$	$\frac{1}{3} + \frac{2}{5} = ?$

6.	7.	8.
$\frac{1}{2} + \frac{1}{5} = ?$	$\frac{2}{3} + \frac{2}{6} = ?$	$\frac{2}{3} + \frac{3}{9} = ?$
$\frac{2}{3} + \frac{1}{2} = ?$	$\frac{1}{3} + \frac{3}{4} = ?$	$\frac{1}{3} + \frac{2}{5} = ?$
$\frac{2}{3} + \frac{3}{5} = ?$	$\frac{2}{3} + \frac{5}{6} = ?$	$\frac{2}{4} + \frac{2}{3} = ?$

9.	10.	11.
$\frac{4}{6} + \frac{1}{2} = ?$	$\frac{3}{8} + \frac{2}{4} = ?$	$\frac{3}{4} + \frac{1}{2} = ?$
$\frac{3}{5} + \frac{1}{2} = ?$	$\frac{2}{4} + \frac{5}{8} = ?$	$\frac{5}{6} + \frac{1}{3} = ?$
$\frac{3}{4} + \frac{2}{12} = ?$	$\frac{3}{8} + \frac{2}{4} = ?$	$\frac{6}{7} + \frac{1}{2} = ?$

12.	13.	14.
$\frac{3}{4} - \frac{2}{3} = ?$	$\frac{1}{2} - \frac{1}{3} = ?$	$\frac{7}{10} - \frac{2}{5} = ?$
$\frac{2}{3} - \frac{1}{2} = ?$	$\frac{7}{8} - \frac{1}{2} = ?$	$\frac{4}{5} - \frac{3}{4} = ?$
$\frac{1}{3} - \frac{1}{9} = ?$	$\frac{6}{7} - \frac{1}{2} = ?$	$\frac{5}{6} - \frac{1}{3} = ?$

15.	16.	17.
$\frac{4}{5} - \frac{3}{4} = ?$	$\frac{9}{12} - \frac{1}{2} = ?$	$\frac{1}{2} - \frac{2}{5} = ?$
$\frac{3}{4} - \frac{2}{5} = ?$	$\frac{5}{6} - \frac{2}{3} = ?$	$\frac{1}{3} - \frac{2}{9} = ?$
$\frac{7}{12} - \frac{1}{2} = ?$	$\frac{3}{4} - \frac{1}{2} = ?$	$\frac{1}{2} - \frac{3}{8} = ?$
$1 - \frac{2}{3} = ?$	$\frac{5}{6} - \frac{1}{2} = ?$	$\frac{8}{9} - \frac{2}{3} = ?$
$1 - \frac{5}{6} = ?$	$\frac{3}{4} - \frac{1}{3} = ?$	$\frac{8}{9} - \frac{5}{6} = ?$
$1 - \frac{7}{8} = ?$	$\frac{7}{8} - \frac{3}{4} = ?$	$\frac{9}{10} - \frac{4}{5} = ?$

ORAL.

1. I have $\frac{1}{7}$ as many marbles as Dick, who has 49. How many have I?

2. Harry's father earns $48 a month. Harry earns $\frac{1}{8}$ as much. How much does Harry earn?

3. If you receive 30 cents for selling pop-corn balls at 2 for 5 cents, how many will you sell?

4. How many quart cans can be filled from 32 pints of milk?

5. If you make 36 dots on your slate so that there will be the same number of dots each way, how many will there be each way?

6. Can you arrange 25 dots in the same way? 49? 20?

7. How many pentagons have as many sides as 5 octagons?

8. James ate 7 plums, which were $\frac{1}{8}$ of all he had. How many had he at first? How many after eating?

9. If you draw a square and then draw a line through the middle, into how many equal parts is the square divided?

10. If you divide each half into halves, how many parts will you have? If you divide each quarter into halves, how many parts will you have?

11. Draw 3 inch squares. Divide the first one by drawing a vertical and horizontal diameter. Divide the second by drawing both diagonals. Divide the third by drawing 3 vertical lines $\frac{1}{4}$ of an inch from each other. Into how many parts is each square divided? Are these parts of the same shape? Are they of the same size?

12. My slate is $66\frac{2}{3}\%$ of a foot wide. How many inches wide is it?

13. A farmer had 36 cows, and sold $33\frac{1}{3}\%$ of them. How many did he sell?

a 36	*b* 47	*c* 55	*d* 64	*e* 73
f 28	*g* 19	*h* 37	*i* 48	*j* 59
k 61	*l* 74	*m* 88	*n* 96	*o* 38
p 46	*q* 57	*r* 66	*s* 75	*t* 86
u 99	*v* 39	*w* 45	*x* 58	*y* 65
z 97				

Add the numbers corresponding with the following letters:

1. *city.*	**2.** *state.*	**3.** *county.*
4. *Massachusetts.*	**5.** *Holyoke.*	**6.** *school.*
7. *church.*	**8.** *book.*	**9.** *arithmetic.*
10. *geography.*	**11.** *history.*	**12.** *language.*
13. *ajkzu.*	**14.** *abcdefg.*	**15.** *bcdefgh.*
16. *cdefghi.*	**17.** *defghij.*	**18.** *efghijk.*
19. *fghijkl.*	**20.** *ghijklm.*	**21.** *hyklmn.*
22. *ijklmno.*	**23.** *jklmnop.*	**24.** *klmnopq.*
25. *lmnopqr.*	**26.** *mnopqrs.*	**27.** *nopqrst.*
28. *opqrstu.*	**29.** *pqrstuv.*	**30.** *qrstuvw.*
31. *rstuvwx.*	**32.** *stuvwxy.*	**33.** *tuvwxyz.*

34. $a+g-p+u-q.$	**35.** $c+m-r+n-y.$
36. $k+z-v+t-x.$	**37.** $u-w+l-g+d.$
38. $o+s-k+f-a.$	**39.** $n-h+b-i+t.$
40. $y-x+l-g+b.$	**41.** $e-j+y-m+g.$
42. $u+l-b+d-j.$	**43.** $y+t-o+j-e.$
44. $x+s-n+d-i.$	**45.** $w+r-m+c-h.$
46. $v+q-l+b-g.$	**47.** $u+p-k+a-f.$
48. $a-f+k-p+u.$	**49.** $b-g+l-q+v.$
50. $c-h+m-r+w.$	**51.** $d-i+n-s+x.$
52. $e-j+t-o+y.$	**53.** $z-q+d-h+y.$

ORAL.

1. If $\frac{1}{8}$ of my money is \$6, how much money have I?

2. What will it cost to launder 4 collars and 6 cuffs at $1\frac{1}{2}$¢ each?

3. How many months in a quarter of a year?

4. How many hours from 9 P.M. to 6 A.M.?

5. If 5 cents is $\frac{1}{4}$ of my money, how much is the rest of it?

6. A square is 12 in. long. What can you call it?

7. A rectangle is 6 in. long and 4 in. wide. Into how many half-inch squares can it be divided?

8. In 49 days how many weeks?

9. Is a square a rectangle?

10. Is a rectangle a square?

11. What is the difference between a square and a rectangle?

12. What will 4 oz. of cloves cost at 24¢ a pound?

13. If a tumbler holds $\frac{1}{2}$ pint of jelly, how many tumblers will your mother need to hold 2 qt. of jelly?

14. If you sleep $\frac{1}{3}$ of your time, how many hours will you sleep in a week?

15. A half-note in music equals how many quarter-notes? How many eighth-notes?

16. A quarter-note in music equals how many eighth-notes?

17. How many 2-inch squares can you draw in a 6-inch square?

18. Draw a 2-inch square and a 4-inch square. Compare their length, perimeters, and surfaces.

19. A rectangle contains 20 square inches, and is 4 in. wide. How long is it? Make a diagram on the board to illustrate.

20. If you have 17 cents, how many more cents do you need in order to have 25 cents?

1. How many inch cubes will a box contain, if it is 9 in. long, 6 in. wide, and 5 in. deep?

2. Find the area of a sidewalk 48 ft. long and 8 ft. wide.

3. Bought a bicycle for $40, and sold it so as to gain 10%. What did I receive for it?

4. Change $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{6}$, $\frac{1}{9}$ to 18ths.

5. Change to improper fractions, $2\frac{5}{8}$, $8\frac{3}{4}$.

6. Change to mixed numbers, $\frac{23}{8}$, $\frac{30}{7}$.

7. Find the sum of $\frac{3}{4}$ and $\frac{1}{2}$.

8. Find the difference between $\frac{3}{4}$ and $\frac{1}{2}$.

9. How many months are left after $66\frac{2}{3}\%$ of the year is gone?

10. If a watch cost $8, and in selling it I lose 25%, for how much do I sell it?

11. 9 ft. 9 in. are how many inches?

12. How many cubic feet in a pile of wood 10 ft. by 6 ft. by 4 ft?

13. Find the number of square yards in the walls, floor, and ceiling of your schoolroom. Omit fractions of a yard in measuring.

14. Find the number of square feet of blackboard in your schoolroom. Omit fractions of a foot in measuring.

15. Multiply 78 by 9.

16. Divide 497 by 7.

17. Add: $2.05, $6.17, $7.34, $5.13, and two dollars and nine cents.

18. Subtract: Five dollars and seventeen cents from nine dollars and two cents.

19. Find the sum of all the even numbers between 1 and 30.

20. Find the sum of all the odd numbers between 30 and 60.

21. Write these numbers in words: 46, 201, 610, 405.

This book should be returned to the Library on or before the last date stamped below.

A fine of five cents a day is incurred by retaining it beyond the specified time.

Please return promptly.

HARVARD COLLEGE
LIBRARY



THE ESSEX INSTITUTE
TEXT-BOOK COLLECTION

GIFT OF

GEORGE ARTHUR PLIMPTON

OF NEW YORK

JANUARY 25, 1924